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DISEASES CAUSED BY BACTERIA AND FUNGI.

HOPKIRK, C. S. M. (1933). **A Method for the Control of Mastitis in Dairy Cows.** —*Austral. Vet. J.* **9.** 53-61. 3 tables.

In view of the lack of success which has attended research on serological and chemical means of prevention and treatment of mastitis, attention has been concentrated on evolving a method of eradication which is simple in application and efficient in practice. A scheme is outlined which is being tried out in New Zealand. The results obtained so far are given, but no estimate of the value of the scheme is yet possible. Milk samples from cows tested are allowed to stand at room temperature for two hours, a loop 2 mm. in diameter is immersed in the cream and a smear about 1 cm. in diameter is made. Diagnosis is based on the average number of leucocytes per field. Milk samples are examined monthly and the cows in a herd are grouped accordingly into :—(a) those free from mastitis ; (b) suspicious, mild or indefinite cases and (c) acute cases. The groups are milked in this order and attention is paid to general hygiene. The method of diagnosis has been compared with cultural methods and the results are in general agreement.

The contagiousness and the aetiology of mastitis are discussed and the necessity for keeping an open mind on these subjects is stressed. The relationship of infection with *Br. abortus* and with vaccinia virus to mastitis is being investigated. Mastitis developed in a cow which was inoculated intravenously with vaccinia and in another whose teats were inoculated with the virus after scarification.

—W. I. B. BEVERIDGE.

MINETT, F. C., STABLEFORTH, A. W., & EDWARDS, S. J. (1933). **Studies on Bovine Mastitis. VIII. The Control of Chronic Streptococcus Mastitis.**—*J. Comp. Path. & Therap.* **46.** 131-138. 1 table. [9 refs.] [For abstracts of previous papers of this series see this *Bull.* **1.** 276, **2.** 366 and 588, and **3.** 586].

Observations lasting for five years were made in a self-contained herd consisting of 53 cows and heifers, of which ten were affected at the beginning with chronic streptococcus mastitis. Preventive measures, which merely involved the milking of infected cows last, led to the formation of a group of cows which for 3½ years have remained free from the streptococci which cause the chronic and contagious form of mastitis. During this time, five of the originally infected cows completely recovered. This appears to be the first time that it has been conclusively proved by frequent and searching tests of the milk that a herd of cows can be maintained free from infection. This constitutes the final proof that

chronic streptococcus mastitis is a contagious disease and, therefore, theoretically preventable.—F. C. MINETT.

LITTLE, R. B., & JONES, F. S. (1933). **The Correlation between Certain Properties of Milk and the Type of Inflammation in Acute Mastitis.**—*J. Amer. Vet. Med. Ass.* **82.** 818-825. 5 tables. [8 refs.]

Samples of milk were taken from each of the quarters of 15 cows affected with acute mastitis, chosen at random from a large dairy herd. The samples were drawn within a few hours of the onset of clinical symptoms and were studied with regard to bacterial content, leucocyte content, pH and quantity of whey proteins. 47 samples showed streptococci or haemolytic staphylococci in sufficient numbers to account for the inflammation. There was a general correlation between the results of the various tests, but it was by no means absolute in the case of any two, except bacterial content of streptococci or haemolytic staphylococci and leucocytosis. The various changes which are manifested in the secretion are believed to indicate different forms of reaction to the infective agent. A sharp rise in whey proteins and pH is believed to indicate tissue destruction and vascular derangement, allowing either blood proteins or blood bases to pass into the milk, whilst a purulent secretion in which leucocytosis is the only marked characteristic is believed to be of a more superficial nature.—A. W. STABLEFORTH.

DIERNHOFER, K. (1933). Morphologische Beobachtungen an Streptokokken. [**Morphological Observations on Streptococci**].—*Zschr. Fleisch.- u. Milchhyg.* **43.** 225-230. 18 figs. on 1 plate. [2 refs.]

Diernhofer draws his conclusions from observations made on about 160 strains of mastitis streptococci, which were cultivated on plain agar, serum agar or agar with the addition of 2 per cent. peptone and 0·2 per cent. nucleinic acid, and in plain broth. He arranges them into the following groups :—(a) non-haemolytic strains which produce clean-edged smooth colonies and a uniform turbidity in broth ; (b) non-haemolytic strains which produce colonies with moderately wavy and curled edges and which give a flocculent deposit with clear supernatant in broth ; (c) haemolytic strains with similar characters, and (d) haemolytic strains which give smooth colonies, but in broth produce a flocculent deposit with more or less turbid supernatant.

Besides all these forms, which he regards as the basic S forms (" perhaps in part O forms ") it is stated that all mastitis strains can assume an R form which is characterized by coarsely curled or locked colonies on agar and a tenacious flocculent deposit in broth, but which are similar to the S form in haemolytic and biochemical characters.

The splitting off of the rough form from smooth colonies can frequently be observed and, according to Diernhofer, these rough portions of the colony, which are usually wedge-shaped, produce pure rough growths on further subculture. The tendency to the production of rough variants varies according to the strain, but is fairly constant. An interesting observation is that a change to the rough state may occur in an udder which has been severely affected by a smooth strain. No difference in the pathogenicity of the various forms could be found.

The author concludes that, in the examination of milk for diagnosis or control, as little reliance should be placed on the form of the colonies on agar as on the appearance of the streptococci themselves or their chains. Colony form may be of some help, but only to the observer familiar with the various colony forms.

Biochemical properties are considerably more constant and dependable.

—A. W. STABLEFORTH.

LANCEFIELD, Rebecca C. (1933). **A Serological Differentiation of Human and Other Groups of Hemolytic Streptococci.**—*J. Exp. Med.* **57.** 571-595. 6 tables. [22 refs.]

By means of precipitation tests with extracts prepared with hot N/20 hydrochloric acid and sera prepared with formalinized cultures, the author has been able to arrange 104 out of 106 strains of haemolytic streptococci from man, animals, milk and cheese into five groups which bear a definite relation to the source of the strains. These broad groups, which agree with those described by other workers on the basis of cultural and biochemical characters, can be subdivided into specific types ; a further report on these is promised. Group A was composed of 23 strains largely of human origin ; group B of 21 strains mostly from mastitis and normal milk ; group C of 49 strains from a variety of sources in the guinea pig, rabbit, horse, fox, pig and fowl, and certain strains from bovine mastitis. These mastitis strains were of the kind which only depress the pH of sugar media to about 4·8 or higher, do not hydrolyse sodium hippurate and which are pathogenic to rabbits and mice ; group D of 8 strains from cheese, and E of 3 strains from certified milk.

It is believed that the group substance is of a carbohydrate nature. This has already been shown to be the case in strains of groups A and B. It will be recalled from other work that hot N/20 hydrochloric acid extracts also contain the type specific factor (M). The broad groupings described in this paper depend, therefore, upon the preparation of sera which contain a large amount of the group factor and a relatively small amount of the specific factor. Formalin apparently assists to this end.—A. W. STABLEFORTH.

I. DOLD, H. (1933). Unterschiedliches Verhalten der Streptokokken- und Pneumokokkenkulturen gegenüber meiner Differentialfärbung. [**Diverse Behaviour of Streptococci and Pneumococci with my Differential Method of Staining**].—*Zlb. Bakt. I.* (*Orig.*). **127.** 367-374. 2 tables. [1 ref.]

II. DOLD, H. (1933). Unterschiedliches Verhalten von Enterokokkenstämmen (Enterokokkenkulturen) gegenüber meiner Differentialfärbung. [**Diverse Behaviour of Enterococci with my Differential Method of Staining**].—*Ibid.* 374-378. 2 tables. [6 refs.]

I. Cultures on solid media of 15 strains of non-pathogenic streptococci (*Str. lactis*, *Str. cremoris*, *Str. thermophilus* and *Str. faecalis*) and of 26 strains of pathogenic streptococci (*Str. pyogenes*, *Str. viridans*, *Str. mastiditis* and *Str. equi*) gave regularly negative results when stained by Dold's method [(1932). *Zlb. Bakt. I.* (*Orig.*). **124.** 220]. Cultures of nine strains of *Str. mucosus* and of 39 strains of pneumococci of all types were irregularly variable.

II. Cultures of enterococci did not all behave alike. Out of 35 strains, 14 regularly gave negative results, whilst the remainder gave irregular results often changing sharply from generation to generation.

In the case of both pneumococci and of enterococci, some strains usually gave positive, others usually negative results.

Similar results were obtained with cultures aged from one to six days. The results obtained with organisms grown in fluid media or from tissues were different and are to be dealt with later. The author believes that these staining reactions show that some of the enterococci are allied to the streptococci and some to the pneumococci.—A. W. STABLEFORTH.

CROWE, H. W. (1933). **Agglutination Experiments as Evidence of the Diversity of Nonhemolytic Streptococci.**—*J. Infect. Dis.* **52.** 192-202. 3 tables. [22 refs.]

The non-haemolytic streptococcus strains examined by the author were classified into main groups by the following characters :—(a) microscopic appearance and colonial growth on Crowe's chocolate blood agar and (b) fermentation reactions, regarded as being reliable when using constant media.

By means of the agglutination test, subdivision could be made of those organisms which gave the same fermentation reactions although different on chocolate agar. Specific antisera were prepared from rabbits and, to prevent auto-agglutination, the antigen was treated with 2 per cent. potassium hydroxide. On account of the fact that normal rabbit serum was found to agglutinate streptococci up to a titre of 1 : 200, all immune sera were diluted 200-fold before use.

—S. J. EDWARDS.

I. BASSET, J. (1933). Pouvoir pathogène du virus charbonneux et de vaccins bactéridiens sporulés. [**Pathogenic Power of *B. anthracis* and of Spore Vaccines**].—*C. R. Soc. Biol. Paris.* **113.** 783-786.

II. BASSET, J. (1933). La Bactéridie charbonneuse en culture anaérobie. [**Anaerobic Culture of the Anthrax Bacillus**].—*Ibid.* 786-788. [2 refs.]

III. BASSET, J. (1933). Action du sérum anticharbonneux sur le virus correspondant. [**Action of the Anti-Anthrax Serum on the Corresponding Virus**].—*Ibid.* 788-790. [2 refs.]

I. In view of his experiments (on about 90 animals)—which indicate the variable susceptibility of guinea pigs to anthrax spores and to a mixture of spores and vegetative forms, and differences in the relative susceptibility of sheep, rabbits and guinea pigs—the author stresses the danger of relying upon guinea pig or rabbit titrations only and the importance of testing out a vaccine on the species for which it is intended.

II. *B. anthracis* grows well under conditions suited to pathogenic anaerobes. The properties of the resulting culture are similar to those of aerobic cultures, with the exception that spores do not appear until later than 36 hours at 37°C. Cultures which are wholly in the vegetative phase can thus be obtained. These are much more regularly pathogenic for guinea pigs and offer a more precise basis for the titration of anti-anthrax serum.

III. Anti-anthrax serum is of no value whatever. The doses of certain products recommended for the sheep or ox did not protect against subcutaneous injection of spores, vegetative forms or mixed cultures.

The part played by serum in Sobernhein's method is, therefore, illusory.

—A. W. STABLEFORTH.

JEZIC, J. (1933). Un breve saggio dell'uso del vaccino Carbozoo in Jugoslavia. Del pari alcune osservazioni sul vaccino glucoside in generale. [**Use of "Carbozoo" Anthrax Vaccine in Jugoslavia. General Note on Glucoside Vaccines**].—*Clin. Vet. Milan.* **56.** 448-449. [4 refs.]

Out of 450 head of cattle and horses in an anthrax-infected area, 214 were vaccinated with "carbozoo" from the Serum Institute at Milan.

During the following year no cases of anthrax occurred amongst the vaccinated stock, whereas six deaths from anthrax and two other deaths, apparently also from anthrax, occurred amongst the unvaccinated stock.

Laboratory experiments did not confirm the results of HRUSKA on the inhibiting action of 10 per cent. "saponine" or "digitonine" on the infectivity of anthrax laboratory strains.—F. VEGLIA (TURIN).

I. Wolters, K. L., & Dehmel, H. (1932). Ueber das Vorkommen von Geflügeltuberkelbakterien beim Rind und ihre Differenzierung. [**The Presence of Avian Tubercle Bacilli in Cattle and their Differentiation**].—*Zschr. Infektkr. Haust.* **41.** 71-79. 1 plate. [23 refs.]

II. Lichtenstein, Stefania. (1933). Reinzüchtung von Geflügeltuberkelbakterien aus dem Kot tuberkulöser Hühner. [**Pure Cultivation of Avian Tubercle Bacilli from the Faeces of Tuberculous Hens**].—*Zlb. Bakt. I. (Orig.).* **128.** 517-518. [1 ref.]

I. Tubercle bacilli of the avian type were recovered from the mixed milk of small farms by cultural and by guinea pig inoculation methods. The examination of quarter milk samples and of tracheal mucus from individual cows with no signs of udder tuberculosis also showed their presence. Twenty-seven strains isolated from milk were identified as belonging to the avian type by inoculating mice, guinea pigs, hens and rabbits, and by cultural characters on Petragnani's medium and in Besredka's broth.

II. From the faeces of 12 hens which had been injected subcutaneously with avian tubercle bacilli, the bacilli could be recovered in all cases by the following cultural method. After thorough maceration of the faeces with saline, the emulsion obtained was filtered through a metal sieve to remove coarse particles and again through muslin. The filtrate was centrifuged for 20 to 25 minutes and the deposit treated with 10 c.c. of a 10 per cent. solution of hydrochloric acid for about six minutes and again centrifuged. The deposit was spread on the surface of Petragnani's medium on which colonies of tubercle bacilli developed after 12 to 16 days incubation.—S. J. Edwards.

Griffith, A. S., & Summers, G. J. (1933). **Human and Bovine Infections in Bone and Joint Tuberculosis.**—*Lancet.* **224.** 875-876. 2 tables.

The authors record the results of their investigations of 86 cases of bone and joint tuberculosis drawn from the middle west and south of Scotland over a period of three and a half years up to October, 1932. Twenty-five of the cases were recorded in 1932. The present report deals with the whole series.

In 81 cases, cultures were obtained either direct from the pus collected or through guinea pigs. The cases fell into two sharply distinguished groups. In 54 cases the organism was of the human type and in 27 cases (33·3 per cent.) of the bovine type.

Of the 81 cases, 37 were in children under 10 years of age and, of these, 21 (56·8 per cent.) were of bovine origin. Of the remaining 44 cases in persons 10 years of age or over, only six (13·6 per cent.) were of bovine origin.

—S. H. Gaiger.

I. Mellon, R. R., Richardson, Ruth D., & Fisher, L. W. (1933). **Further Studies on the Life Cycle of the Avian Tubercle Bacillus.**—*J. Bact.* **25.** 45-47. [Paper read at 34th Ann. Meet. Soc. American Bacteriologists].

II. —. (1933). **The "Life Cycle" of the Tubercle Bacillus.**—*J. Amer. Med. Ass.* **100.** 1342. [3 refs.]

III. Mellon, R. R. (1933). **The Life Cycle of the Tubercle Bacillus.**—*Ibid.* 1794.

I. Dissociation of the tubercle bacillus into non-acid-fast progeny and its occasional reversion to the original has previously been observed. The brief account of what is considered to be a life cycle for the tubercle bacillus is given in the above reference as an abstract of a paper presented to the 34th Annual Meeting of the Society of American Bacteriologists held in December, 1932.

The cycle is stated to consist of four stabilized stages which are vegetative and three transition stages between them which are reproductive. Each important stage has been subjected to a single-cell technique before proceeding to the next stage. Stage 1 is the S form of the avian tubercle bacillus, which gives rise to a filtrable form (stage 2). Stages 3, 4, 5 and 6 are stated to be diplococcal forms, tetrads, diphtheroids and acid-fast gonidia respectively. These latter germinate into the R form which presumably may develop into the original S form. Stages 1, 6 and 7 are acid-fast. Conclusive evidence of a sexual mechanism has not yet been obtained.

II. A comment has been written on the work of MELLON and his co-workers, who in another paper [(1932). *Proc. Soc. Exp. Biol. New York.* **30.** 80.] have suggested a life cycle occurring in the tubercle bacillus. There is a reference to the possibility of a sexual mechanism involved in the process. The comment also refers to the work of MILLER [this *Bull.* **3.** 65.] who describes pleomorphism occurring amongst strains of tubercle bacilli when subjected to a sterile filtered extract of a chromogenic strain of tubercle bacillus.

III. A letter written by Mellon explaining that in an editorial comment on the life cycle of the tubercle bacillus with references to his work and that of his colleagues, an impression is given that they had postulated the existence of morphologically distinct male and female sex cells. He points out that their original suggestion was merely of an autogamous fusion, that is, one of the lowest orders of sexuality. It is put forward as a theory not as a proven fact and rather as an explanation of the variants described which, he maintained, are capable of reversion to the tubercle bacillus without recourse to animal passage. [It would appear to be preferable to adopt a conservative and critical attitude regarding the life cycle theory, and await further proof and confirmation].—R. LOVELL.

COHN, M. L. (1933). **An Analysis of Loewenstein's Method for Isolating Tubercle Bacilli from Blood.**—*J. Infect. Dis.* **52.** 214-222. 2 figs., 5 tables. [12 refs.]

A criticism of Löwenstein's method for the isolation of tubercle bacilli from the blood is based on experimental data. It is maintained that the use of acetic acid for haemolysis is not as satisfactory as sulphuric acid, for whereas sulphuric acid in an actual concentration of 3 per cent. is stated to be innocuous for human and bovine tubercle bacilli if left in contact for 30 minutes at 37°C., similar treatment with acetic acid kills tubercle bacilli. This is noticeable when quantitative tests are performed and is not so evident with heavier suspensions. An example is given whereby blood cultures were taken from a dog at intervals after intravenous injection of a suspension of human tubercle bacilli. Only one positive result was obtained by Löwenstein's method, and this just prior to death, whereas four out of six cultures were positive after treatment of the blood with sulphuric acid, neutralization with sodium hydroxide and cultivation on an egg yolk medium.

Although Löwenstein's method is stated to be satisfactory for the growth of small numbers of tubercle bacilli, the medium is said to be more involved than is necessary and, further, the acetic acid is innocuous to saprophytic acid-fast bacilli ; moreover, if these are present in the blood, they may develop on the media, whereas they are not recovered when sulphuric acid is used.

The blood culture method advocated by the author is to add 15 c.c. of 6 per cent. sulphuric acid to 10 c.c. of citrated blood. The culture is incubated at 37°C. for 30 minutes, and then neutralized with 5 per cent. sodium hydroxide to about pH 7·0. Centrifugation of the precipitate which is formed and washing with saline is then carried out, after which the sediment is inoculated on to inspissated glycerine water-egg yolk medium.—R. LOVELL.

LURIE, M. B. (1933). **A Correlation between the Histological Changes and the Fate of Living Tubercle Bacilli in the Organs of Reinfected Rabbits.**—*J. Exp. Med.* **57.** 181-202. 2 figs., 4 plates. [10 refs.]

After alluding to his former conclusion that the epithelioid cell of tuberculosis is a mononuclear cell which has destroyed and partially digested tubercle bacilli or their products, the author describes his experiments and gives his conclusions on the study of reinfection of rabbits with bovine and human types of tubercle bacilli.

Rabbits which had partially recovered from a primary infection were reinfected and later killed at intervals of one to 60 days; their organs were examined culturally and histopathologically.

The experiments are described in considerable detail and it is deduced that acquired immunity is superimposed on the natural resistance of a given organ and is greater in an organ that has a higher initial resistance against the tubercle bacillus. Furthermore, it is stated that the more extensive the persistant primary lesion is, the more rapid and complete will be the destruction of the bacilli of reinfection, even though the primary infection will ultimately destroy organs in the infected animal. The more rapid destruction of the bacilli of reinfection is a function of the acceleration and intensification of the inflammatory process.

—EDWARD F. PECK.

I. BICKFORD, J. van A. (1932). **Cellular Reactions in the Meninges of Rabbits to Tubercle-Lipoid, Protein, and Polysaccharide, Compared with the Effects of Tubercle Bacilli.**—*J. Exp. Med.* **56.** 39-62. 4 figs. on 1 plate, 3 tables, 3 charts. [33 refs.]

II. SMITHBURN, K. C. (1932). **The Effect of Lymphocytosis Induced with Embryonic Extract on the Course of Experimental Tuberculosis in Rabbits.** —*Ibid.* 173-183. 1 table, 3 charts. [30 refs.]

I. This paper is a study in the meningitis experimentally produced by the injection of living and dead tubercle bacilli into the subarachnoid space in tuberculous and normal rabbits as compared with the effects of extracts of the bacilli. The work of previous investigators stating that subarachnoid injections of tubercle bacilli produce typical tuberculous meningitis was confirmed. [Further references on this aspect should be made to the important paper by RICH & MCCORDOCK. (1933). *Bull. Johns Hopkins Hospital.* **52.** 5, which discusses in detail the pathogenesis of tuberculous meningitis and the relation to allergy and immunity].

An increase in lymphocytes in the meninges does not accompany increased resistance. Both living and dead bacilli as well as tuberculo-phosphatide give rise to lesions in which the same type of cell is found. The author defines this as a meningeal epithelioid cell, concludes that it is a less differentiated monocyte and suggests that it may prove of value in diagnosis of tuberculous meningitis. Heat-killed organisms were not innocuous, but produced similar lesions after delayed reaction of two months.

II. Recent work has led to the belief that lymphopenia is a factor of low resistance to disease and lymphocytosis of an increased resistance. [On this subject reference can be made to MURPHY, J. B. (1926), *Monog. 21, Rockefeller Inst. for Med. Res. New York,* or to numerous papers by MURPHY and his collaborators which have appeared in *J. Exp. Med.* from about 1915 onwards]. The author of the first paper utilized embryonic extract to produce lymphocytosis; differential blood counts were done with supra-vital technique.

The extract caused a lymphocytosis and lymphoid hyperplasia and also lowered values for haemoglobin and red blood cells, but did not favour the course

of the disease. [This is in contrast to the conclusions of MURPHY and his co-workers who, as a result of many experiments, concluded that the lymphocyte plays a highly important role in resistance to disease. Their earlier work was done mainly in connection with the role of the lymphocyte and immunity to transplantable tumours. Although there are very numerous objections to their hypothesis, many of their conclusions have been accepted, perhaps rather hastily, as substantiated facts].

It was suggested that when lymphocytosis is accompanied by an increase of resistance, the age of the lymphocyte is an important factor and is an incidental expression of some influence directly responsible for resistance. The presence and significance of tuberculous thrombi in the lungs is discussed.

—J. R. M. INNES.

SAENZ, A., & COSTIL, L. (1933). Caractères de la bacillémie à Bacille aviaire chez la Souris inoculée par voie péritonéale. [**The Nature of the Bacillaemia produced in Mice by the Avian Type of** *Mycobact. tuberculosis* **Inoculated by the Peritoneal Route**].—*C. R. Soc. Biol. Paris.* **113.** 698-700. [1 ref.]

This study of the nature of infection in the mouse following intraperitoneal injection of *M. tuberculosis* (avian) is a sequel to similar observations made on the guinea pig with mammalian strains.

Three series of experiments were performed, ten mice being used in each series and all being injected intraperitoneally with saline suspensions of the smooth variety of avian tubercle bacteria. The first series received suspensions containing 1·0 mg., the second series received doses of 0·1 mg. and the third 0·01 mg. of culture in suspension.

From these experiments it was concluded that, as in the case of the mammalian strains, the intensity of the bacillaemia depended upon the amount inoculated. A dose of 1·0 mg. provoked a permanent bacillaemia, whereas with the smaller doses it was of a temporary nature.

Experiments carried out under the same conditions with an avian strain which had become dissociated into S and R forms gave identical results.

—GWILYM O. DAVIES.

NINNI, C., & BRETEY, J. (1933). Sur les divers degrés de résistance des trois types de Bacilles tuberculeux dans l'eau physiologique à l'étuve à 37°C. [**Different Degrees of Resistance of the Three Types of** *Mycobact. tuberculosis* **in Physiological Saline kept at 37°C.**].—*C. R. Soc. Biol. Paris.* **113.** 649-651. [2 refs.]

The authors found the avian type to be much more resistant than the human and bovine strains of *M. tuberculosis* when suspensions of equal strength were made in physiological saline and kept at a temperature of 37°C. When suspensions of each of the three types containing approximately two million organisms per c.c. were compared, there was very little difference between the resistance of the human and bovine forms, which were found to be dead on the sixth day, whereas the avian suspension remained alive for 60 to 80 days.—GWILYM O. DAVIES.

I. DINGLE, J. H., & WEINZIRL, J. (1932). **The Biology of the Tubercle Bacillus. II. The Asparagin and Glycerol Metabolism of the Tubercle Bacillus.**—*J. Bact.* **23.** 281-299. 8 figs., 3 tables. [17 refs.]

II. RICE, Christine E., & REED, G. B. (1932). **Studies in the Variability of Tubercle Bacilli. VII. Antigenic Activity of "S" and "R" Cultures as**

Measured by Complement-Fixation.—*J. Immunol.* **23.** 385-404. 6 tables. [41 refs.]

I. Two strains of tubercle bacilli have been cultivated on the same type of synthetic medium. One, an avirulent S strain, grew rapidly and produced a terminal alkalinity ; the other, virulent, grew more slowly and produced a terminal acidity. Both types utilized the nitrogen of the asparagin, especially the imino-nitrogen. Glycerol was used more rapidly by the faster growing organism.

II. The protein fraction of acid-fast bacilli probably determines type-specific complement-fixation, whilst the lipoid fraction is responsible for group reaction. Aqueous extracts are, therefore, superior to alcoholic extracts in specific antigenic properties. The S variation of a strain appears to contain antigens absent from the R type ; this phenomenon may be related to the protein-lipoid-carbohydrate constitution of S and R variants. [For abstracts of previous articles of this series see this *Bull.* **1.** 189 and 263 ; **2.** 133 and **3.** 171].

—Norman Hole.

Calmette, A., et al. (1933). Compte Rendu Analytique des Travaux des Laboratoires de Recherches sur La Tuberculose. **[Report of the Research Laboratory on Tuberculosis at the Pasteur Institute].** pp. 72. [121 refs.] Paris : Masson et Cie.

This is a report on the investigational work carried out from 1931 to 1932 at the New Laboratory for Tuberculosis at the Pasteur Institute, Paris, under the direction of Professor Calmette. It consists of a review of about 114 articles on various aspects of the tuberculosis problem. [Abstracts of most of these articles have already appeared in this *Bull.* and the few remaining will be noticed in future numbers]. Some idea of the magnitude of these investigations may be gauged from the fact that the names of 37 workers are included in the report.

As these articles have been published in various technical journals which may not be readily available to all engaged on tuberculosis work, a critical survey of the work is here given.

The subject matter is dealt with under seven heads :—

(1) Experimental work on BCG.

(2) A study of artificially induced tuberculosis in guinea pigs and rabbits.

(3) Super-imposed infection and tuberculous allergy.

(4) Tuberculous bacillaemia and haemoculture of tubercle bacilli.

(5) The filtrable form of the tubercle bacillus and its role in the pathology of tuberculous infections.

(6) Cultivation of tubercle and paratubercle bacilli.

(7) Tuberculin. Chemistry of tubercle bacilli.

Investigations have shown that no variations have occurred in the biological characters of strains of BCG cultivated and maintained in different laboratories during the five years 1927 to 1932.

BCG given *per os* to adult guinea pigs can be demonstrated in the internal organs from the fifth day and the bacilli persist in, and can be cultivated from, the organs for at least three months.

Numerous investigations have proved that, in addition to the specific immunity conferred by BCG, it confers also a paraspecific immunity against some of the ailments of children and young animals ; in this fact probably lies the wide variation frequently observed between the general mortality in non-vaccinated and BCG-vaccinated children.

A chapter is devoted to the research work carried out on tuberculous bacillaemia to which Löwenstein has drawn attention. Details are given of the results

obtained to date on the filtrable form of the tubercle bacillus. It has been found that the progeny of tuberculous mothers harbour acid-fast bacilli in the hepatic and mesenteric lymphatic glands, and that these bacilli are avirulent for guinea pigs.

It is stated that, from a long experience in dealing with different strains of tubercle bacilli, the optimum time for subcultivation, in order to retain as far as possible a constant virulence, lies between the 25th and 30th day.

This review contains much important detail of recent work on tuberculosis and should be in the hands of all engaged on the subject.—T. M. Doyle.

Gerlach, F., Segre, S., & Brosch, J. (1933). Ueber Versuche einer Virulenzsteigerung des B.C.G. **[Investigations on the Increase of Virulence of BCG].**—*Zlb. Bakt. I. (Orig.).* **127.** 312-318. [18 refs.]

The authors have attempted to raise the virulence of BCG cultures by procedures outlined by Dreyer and Vollum [this *Bull.* **1.** 103.] and by Sasano and Medlar [(1931). *Amer. Rev. Tuberc.* **23.** 215]. Briefly these procedures consist of deep culture in fluid medium, in the latter case with the addition of rabbit serum. No significant rise of virulence was recorded.—E. J. Pullinger.

Cilli, V. (1932). L'enterite paratubercolare dei bovini. **[Johne's Disease].**—*Nuova Vet.* **10.** 449-454; **11.** 23-29, 57-63, 104-110, 141-148 and 207-212. 14 figs., 2 plates, 6 tables.

A report on an outbreak of Johne's disease on the government farm at Persano (13 per cent. of 350 animals were affected) including a description of the symptoms and lesions.

Bacterioscopic diagnosis was of value only when it was positive. *Mycobact. paratuberculosis* was not constantly found in the faeces of infected animals. The disease could not be transmitted experimentally beyond the first passage.

The infected animals were isolated and the severe cases destroyed.

For early diagnosis of the disease the author advises the intradermal test with johnin and the complement-fixation test with Besredka's antigen after excluding tuberculosis by the common tests.—F. Veglia (Turin).

Murnane, D. (1933). **Caseous Lymphadenitis Investigations. I. Infection Experiments.**—*J. Sci. & Indust. Res. Australia.* **6.** 111-113.

Earlier observations have suggested that sheep commonly become infected with caseous lymphadenitis during shearing operations. An experiment was conducted to ascertain if guinea pigs could be infected by wounding the skin and contaminating the wounds with sweepings from the " counting-out " pens of a shearing shed. Of 127 guinea pigs thus treated, 34 died apparently from septicaemic infections and the remainder were examined *post mortem* six weeks after exposure to infection. None showed any evidence of infection with caseous lymphadenitis.

Considering the greater susceptibility of guinea pigs to caseous lymphadenitis, it is tentatively suggested that " counting-out " pens are not a serious source of infection for sheep.

In a second experiment, 24 guinea pigs were similarly wounded and the wounds dusted with the surface soil from sheep " camps " on affected properties. None became infected with the disease.—W. I. B. Beveridge.

Slagsvold, L. (1933). Sauens pseudotuberkulose (Lymfadenitis caseosa). **[Caseous Lymphadenitis in Sheep].**—*Norsk Vet.-tidsskr.* **45.** 403-412.

A general description of caseous lymphadenitis of sheep. The disease is not uncommon in Norway.—H. C. Bendixen (Copenhagen).

Schmid, G. (1933). Beobachtungen über infektiöse Kälberpneumonie. [**Observations on Infectious Calf Pneumonia**]. —*Schweiz. Arch. Tierhlk.* **75.** 178-181.

The author describes a serious outbreak of calf pneumonia in a breeding establishment, the onset of infection appearing between the 10th day and the 12th week of life. *Corynebact. pyogenes* was isolated from the internal organs of a large number of the cases examined. Evidence is given that the use of a vaccine made from the actual infecting strain of organism may be helpful in stemming an outbreak.—E. J. Pullinger.

I. Guillot, G., & Pigoury, L. (1933). Présence du Bacille du rouget dans la moelle osseuse d'un cheval. [*Erysipelothrix rhusiopathiae* **in the Bone Marrow of a Horse**].—*C. R. Soc. Biol. Paris.* **112.** 554-555. [3 refs.]

II. Verge, J. (1933). Les maladies communes à l'homme et aux animaux : V. L'Erysipéloide ou rouget de l'homme. [**Diseases Common to Man and Lower Animals : V. Erysipeloid in Man**].—*Rev. gén. Méd. vét.* **42.** 65-75. [40 refs.]

I. A mixed culture of *Bact. paratyphosum* B and a slender Gram-positive bacillus was obtained from the marrow of an equine metacarpal bone. The latter organism was identified with *E. rhusiopathiae* by its cultural characteristics, its pathogenicity for the pigeon, the rabbit and the mouse and by its agglutination with a sheep anti-erysipelas serum. It is considered by the authors that the organism was probably an " agonal " invader.

II. Verge reviews the literature on the existence of erysipeloid infections in man. The majority of these cases are directly attributable to contact with porcine products, but there are also on record numerous instances amongst persons who handle fish, particularly shell-fish.

The symptoms of the acute and chronic forms of the human disease are described and the various sources of infection are cited (erysipelas vaccines, infected carcasses, etc.). The use of antiserum is advocated in doses of 5 to 20 c.c. at intervals of a few days, but attention is drawn to the occurrence, fortunately rare, of severe anaphylactic reactions.—R. E. Glover.

Marsh, H. (1933). **Experimental Erysipelothritic Arthritis in Lambs.**—*J. Amer. Vet. Med. Ass.* **82.** 753-766. 3 figs., 5 tables. [2 refs.]

The purpose of this paper is to record the results of experiments planned to determine the natural method of *Erysipelothrix rhusiopathiae* [swine erysipelas bacillus] infection in lambs and the methods of preventing it. In the course of these experiments the presence of infection was confirmed by complete agglutination at a minimum titre of 1 : 100.

The author found that arthritis could be produced by inoculating cultures into the umbilical cord or by exposing the stump to soil impregnated with cultures. Exposure of docking or castration wounds to infected bedding also gave rise to the disease. With regard to docking, the results indicated that infection is much less likely to occur with the hot iron than with the knife or emasculator. Field observations also revealed that careful disinfection of the umbilicus prevents the disease.—Gwilym O. Davies.

Legroux, R., & Genevray, J. (1933). Etude comparative entre le bacille de Whitmore et le bacille pyocyanique. [**Comparative Study of** *Bact. pseudomallei* **and** *Pseudomonas pyocanea*].—*Ann. Inst. Pasteur.* **51.** 249-264. 2 tables.

The authors, struck by analogies between *P. pyocyanea* and *Bact. pseudomallei*, have carried out experiments to ascertain whether they belong to the same group. Although the latter provokes in man a fatal septicaemia with localizations in the lymphatic system and collections of purulent material in the lungs, liver or spleen, comparable to *Pfeifferella mallei* infection, the authors, as the result of their studies of the morphological, cultural and pathogenic properties of the two organisms, consider that it is nearer to *P. pyocanea* than to *Pf. mallei*.—Ll. E. W. Bevan.

Choufour, J. C. (1933). Bijdrage tot de kennis der septichaemie-immunisatie. [**Contribution to the Knowledge of Immunization against Haemorrhagic Septicaemia**].—*Ned.-Indisch. Blad. Diergeneesk.* **45.** 23-43. 7 tables, 2 charts, 1 map. [Summaries in English and German : abst. from orig.]

Research work was carried out on the value of the prophylactic vaccination of buffaloes with an aggressin vaccine which had been in use since 1920. The experiments were carried out during the years 1926 to 1930 in Bantam, in a district where septicaemia epizootica bubalorum occurred every year. Thousands of animals were used, partly for vaccination and partly for control.

The vaccine produced an immunity of at least five months' duration. Vaccination did not cause a temporary increased susceptibility (a negative phase) as Doeve writes [(1931). *Ned.-Indisch. Blad. Diergeneesk.* **42.** 4]. The method of vaccination is practical : 45,000 buffaloes were vaccinated in two and a half months. The results obtained with the prophylactic vaccination are not yet sufficient to form a definite conclusion. Systematic treatment over a long period is necessary. In some cases anaphylactic symptoms were observed in young and old buffaloes when the monsoon changed from West to East. They were seldom observed in the dry season. The symptoms were dyspnoea, nasal and oral bleedings, digestive and locomotory disturbances. These symptoms were more frequent when certain bacterial strains were used for the vaccine.—A. Klarenbeek (Utrecht).

Ossent, H. P. (1932). Ein seuche-immunes wildfarbiges Hausschwein. [**A Wild-Coloured Domestic Pig Immune to Swine Plague**].—*Züchter.* **4.** 152-158. 13 figs., 9 charts. [1 ref.]

The purpose of the work described was to evolve a breed which would combine the good properties of domestic breeds, such as fertility, quick growth and fattening ability, with the extreme hardiness and, above all, resistance to the so-called chronic swine plague, which are characteristic of the wild pig and apparently correlated with wild colour.

Starting from two F_1s, both of wild type, out of the mating of a wild boar and a Bavarian sow, and an F_2 sow from the mating of the progeny of a wild boar and a Hanover-Brunswick sow, successive generations were bred using a Berkshire or cross-bred boar.

Rigid selection was practised for conformation and for disease resistance—the latter by housing in sties infected with chronic swine plague in which nearly all the pigs of domestic colour died whilst quite young, whereas about 90 per cent. of those of wild colour survived.

Much difficulty was experienced in getting the association of wild colour with good fertility and conformation but considerable progress was made from 1929 to 1932, wild colour animals being obtained with a litter average of seven or eight, a gestation period of 110 to 114 days, good fattening qualities

and a 90 to 95 per cent. resistance to chronic swine plague. [It seems uncertain whether the term " chronic swine plague " refers to a pasteurellosis or whether it is used somewhat loosely for diseases of young pigs in general].

—A. W. STABLEFORTH.

PALLASKE, G. (1933). Beitrag zur Patho- und Histogenese der Pseudotuberkulose (Bact. pseudotub. rodentium) der Tiere. [**The Pathogenesis and Histogenesis of Pseudotuberculosis** (*Pasteurella pseudotuberculosis*) **of Animals**].—*Zschr. Infektkr. Haust.* **44.** 43-66. 4 figs. [16 refs.]

Summaries are given of the macroscopic and microscopic findings in artificial and spontaneous pseudotuberculosis in guinea pigs, rabbits, hares, nutrias, turkeys, a pigeon, a canary and 12 cats. Basing his own views on these findings, the author describes the pathogenesis and histogenesis of the disease at some length, dealing fully with the somewhat divergent views of other writers on the subject. He finds no basic difference between the manifestations of the disease in the various species ; it is of a chronic nature and marked by focal lesions which do not usually soften and, except in guinea pigs, are not capsulated. In addition to the focal lesions which have been described by nearly all other writers, the author describes changes of a diffuse nature, particularly affecting the liver—proliferation of the capillary endothelium, and periportal infiltration with lymphocytes and plasma cells. He also describes a periangiitis and endangiitis which were most pronounced in the guinea pigs, cats and the canary. The discussion concludes with a consideration of differential diagnosis.—A. W. STABLEFORTH.

BASSET, J., & MOULIN, A. (1933). Septicémies à *B. Coli* et *B. Viscosum* d'origine vermineuse pour la plupart chez le jeune Mulet. [*Bact. coli* **and** *Bact. equirulis* **Septicaemia of Verminous Origin, mostly in the Young Mule**].—*Rev. vét. et J. Méd. vét.* **85.** 305-320. 5 figs. on 5 plates. [4 refs.]

The loss of mules from a disease appearing to be a septicaemia led the authors to investigate the cause. Both acute and subacute cases are met with, the symptoms in general being loss of appetite and rise of temperature. Petechial haemorrhages on the mucosa are also common. Histological examination of the organs, particularly of the liver, and the isolation of *Bact. coli* and *Bact. equirulis* (*Bact. viscosum equi*) from the blood, favour the hypothesis put forward regarding the aetiology of the condition. The theory is that the strongyles of the intestine, when in sufficient numbers, cause a breach in the intestinal mucosa by penetration and allow intestinal organisms to follow : thus a septicaemia supervenes, caused by organisms which in a healthy animal would be considered non-pathogenic. It is also pointed out that the very presence of the parasites constitutes a state of health which may favour bacterial invasion. Treatment appears to be mainly directed towards the septicaemia.—R. LOVELL.

SAXER, E. (1933). Zur Bekämpfung der Pullorumseuche. [**The Control of** *Bact. pullorum* **Infection**].—*Schweiz. Arch. Tierhlk.* **75.** 20-24. 2 tables, 1 chart. [1 ref.]

The agglutinin titres of four hens heavily infected with *Bact. pullorum* were examined at frequent intervals for a period of eight months. The titres showed a tendency to fluctuate, but over the whole period fluctuations were slight. Two fowls showed a perceptible tendency towards a rising titre whilst in the other two there was no significant change. The lowest titre recorded was 1 : 300 and the highest 1 : 20,000.

In a sitting of eggs collected from a *Bact. pullorum* infected flock, 98 per cent.

of 253 eggs were fertile, but the total loss of chickens during hatching and up to one week of life was 66·7 per cent. Examinations of " several " dead chickens showed infection with *Bact. pullorum*.

The parent flock was then submitted to the agglutination test and the reactors were removed and their eggs not used. The incubator was thoroughly disinfected. Subsequently, sittings from the healthy stock showed a decrease in the total loss of chickens to as low as 35 per cent.

At the end of the year the parent birds were retested once for agglutinins and the young stock twice at a short interval. All reactors were removed. During the following year the total loss of chickens was between 30 and 45 per cent.

—E. J. Pullinger.

Hartwigk, H. (1933). Die Ausscheidung des Bacterium gallinarum mit dem Ei und der Agglutiningehalt des Blutes bei künstlich und natürlich mit dem Erreger der bakteriellen weissen Kükenruhr infizierten Hühnern. [**The Isolation of** *Bact. sanguinarium* **from Eggs and the Agglutinin Content of Blood of Fowls naturally and artificially infected with Bacillary White Diarrhoea**].—*Deuts. tierärztl. Wschr.* **41.** 179-183. [7 refs.]

The technique used for isolating *Bact. sanguinarium* comprised incubating eggs at 37°C. for 14 days and then cooling them off. They were then opened in a sterile manner and about 2 c.c. of yolk were transferred to nutrient broth and incubated for 48 hours. In cases where there was already an embryo, liver material was used as inoculum. The broth culture was plated out upon Conradi-Drigalski plates. 905 eggs were thus examined. It was found that the greatest number of infected eggs were laid in the heavy laying seasons. Infected eggs were not laid until 41 to 67 days after artificial infection.

In the serum agglutination test a titre of 1 : 40 was considered the minimum positive dilution. The earliest positive titres were found between 28 and 42 days after inoculation. The serological test cannot be relied upon to reveal all infected fowls or even to reveal fowls which occasionally lay an infected egg. [See also this *Bull.* **2.** 206].—E. J. Pullinger.

I. Cernaianu, C., & Popovici, I. (1933). Sur l'infection paratyphique spontanée du Pigeon par les Bacilles du type Aertrycke ou Breslau. Essais de vaccination. [**A Spontaneous Paratyphoid Infection of Pigeons due to** *Bact. aertrycke*. **Vaccination Experiments**].—*C. R. Soc. Biol. Paris.* **112.** 829-832.

II. Reichenshammer, C. A. (1932). La Paratyphose du pigeon et son traitement. [**Pigeon Paratyphoid and its Treatment**].—*Thesis for Docteur vétérinaire, Alfort.* pp. 57. 8 tables. [48 refs.]

I. A description is given of an outbreak of paratyphoid in pigeons due to *Bact. aertrycke*. Young pigeons appeared to be rather more susceptible to this organism than adult ones, although the infecting bacillus was recovered from both adult and young which had been infected parenterally. Vaccination with killed cultures was adopted as a control measure as preliminary experiments were encouraging. Sixteen pigeons each received one dose of formolized culture, presumably by the intramuscular route. The proprietor objected to the inclusion of controls, but fortunately one pigeon which had previously belonged to the owner was returned to him ; this pigeon died 25 days later, after being in contact with the vaccinated birds for 15 days. The authors consider that vaccination with a killed culture will control the disease in an infected pigeon-house. The pathogenicity of human beings to this organism is noted.

II. A thesis on paratyphoid infection in the pigeon, summarizing the existing knowledge of this disease. A classification of paratyphoid bacilli is given which is somewhat archaic considering the recent work done on this group in England and in Germany. Three types of the disease are recognized: acute, subacute and chronic. The acute type is exhibited chiefly in young birds 8 to 15 days old and is characterized by diarrhoea, sometimes blood-stained, and death. The subacute type appears to be the condition in which the bird suffers from diarrhoea, but partially recovers, and the chronic type then supervenes. This form may exhibit intestinal, pulmonary, muscular and arthritic symptoms; the latter, combined with atrophy of the pectoral muscles, being somewhat common especially in adult birds. Diagnosis is not always easy unless serological or bacteriological examinations are carried out and these two methods are advocated. The organism may be isolated not only from the viscera and blood but frequently from the bone marrow. The disease appears to be transmitted by the mother as the bacillus has been isolated from the ovaries. [*Bact. aertrycke* has also been isolated from pigeons' eggs—see this *Bull.* **3.** 498]. Vaccination is advocated as a measure of control.—R. Lovell.

Gwatkin, R. (1932-1933). **Infectious Bovine Abortion (Bang's Disease).**—*Canad. Countryman.* **21.** No. 51. 2, No. 52. 2, No. 53. 2; **22.** No. 1. 2, No. 2. 2, No. 3. 2, No. 4. 2, No. 5. 2, No. 6. 25, No. 9. 21, No. 10. 2, No. 11. 27 and No. 12. 2. 1 table.

Russell, who is Chairman of the Committee on Contagious Abortion, convened by the Ontario Research Foundation, states in an introduction that it is the intention of the committee to publish regularly popular articles on the disease in order to inform stock breeders of the progress being made in its control and eradication. He states that, from personal experience, he is aware of the great benefit to be derived from the eradication of bovine contagious abortion and tuberculosis from herds.

Gwatkin has written a popular résumé on contagious abortion and the value of blood testing and segregation for its control. He refers in detail to the more important aspects of the disease, such as the cleaning-up of herds by isolation of infected animals, the two-unit system, sanitary measures, serological tests and the role of the bull in the transmission of infection. This bulletin should prove of considerable value to stock breeders who are anxious to eradicate abortion from their herds.—T. M. Doyle.

Karsten. (1933). Bestimmungen über das freiwillige Abortustilgungsverfahren der Landwirtschaftskammer für die Provinz Hannover. [**Regulations of the Hanover Provincial Chamber of Agriculture for the Voluntary Eradication of Abortion**].—*Deuts. tierärztl. Wschr.* **41.** 282-285.

Karsten sets out the regulations in detail and explains the conditions to be fulfilled in order to obtain official recognition of herds as "abortion-free," and the measures to be taken to preserve them from infection. Rules are also given for the creation of abortion-free herds from herds that are (a) slightly infected and (b) strongly infected. These include careful elimination by means of blood or milk tests of all infected cows, segregation of doubtful animals, thorough cleansing and disinfection after an abortion, etc. No new animals must be admitted to the herd except from abortion-free herds. The cleansing and disinfection of segregated cows will be undertaken by the Chamber of Agriculture at a small charge, but blood tests are at the cost of the owner.—F. Bullock.

DUBOIS, C. (1933). Spécificité de la réaction allergique comme procédé de diagnostic de la mélitococcie ovine. [**Specific Nature of the Allergic Reaction when used in the Diagnosis of Ovine *melitensis* Infection**].—*Ann. Inst. Pasteur.* **50.** 632-650. 7 tables. [2 refs.]

In previous articles the author has described the successful diagnosis of ovine *melitensis* infection by an allergic test in which killed *Br. abortus* antigen is employed [this *Bull.* **3.** 407]. In this article he describes fully the reaction provoked in animals infected experimentally and naturally, and in healthy control animals, and compares the results with those obtained with melitin. He considers that his method is sufficiently accurate and practical to replace the agglutination test.

—NORMAN HOLE.

I. WADE, Emmeline. (1933). **Undulant Fever Detected by Routine Examination of Sera.**—*Lancet.* **224.** 1342-1343. 1 table. [4 refs.]

II. MARR, D. M. (1933). **A Fatal Case of Undulant Fever in the North of Scotland.**—*Brit. Med. J.* June 3rd. 959-960. 1 chart. [4 refs.]

III. UNWIN, H. R. (1933). **Abortus Fever in Dorset.**—*Ibid.* 961.

I. The author examined 1,331 sera for brucella and enteric group infections from patients suffering from pyrexia. Twenty-eight of these agglutinated *Br. abortus* only. The titres obtained were :—14 cases, 1 : 2,560 ; 10 cases, 1 : 1,280 ; 3 cases, 1 : 640 and 1 case, 1 : 320. In ten cases attempts were made to isolate the organism, but only one positive result was obtained.

II. Marr describes the symptoms exhibited by a man affected with undulant fever that ended fatally. Diagnosis was based on the symptoms and on the agglutination titre of the blood serum for *Br. abortus* ; the serum caused no agglutination of *Bact. typhosum* and *Bact. paratyphosum* A, B and C. All attempts to isolate the organism failed.

The titre of the serum progressively increased from 1 : 600 to 1 : 12,800 and two days before death it agglutinated both *Br. abortus* and *Br. melitensis* to a dilution of 1 : 51,600.

III. Unwin records a case of undulant fever in a dairyman. Diagnosis was based on the symptoms and on the results of serological tests. Attempts to isolate the organism from the blood and urine were unsuccessful.—T. M. DOYLE.

MACKIE, T. J., VAN ROOYEN, C. E., & GILROY, E. (1933). **An Epizootic Disease Occurring in a Breeding Stock of Mice ; Bacteriological and Experimental Observations.**—*Brit. J. Exp. Path.* **14.** 132-136. [3 refs.]

The authors describe an outbreak of a fatal epizootic disease in mice. The disease, which appeared in acute and subacute forms, was characterized by the appearance of oedematous swelling of the feet and legs and by occasional ulceration of the feet with serous discharge resulting in crusting. In a certain proportion of the affected animals, swelling of the legs and feet was absent, but the hind legs became partially or completely paralysed. Death took place within 14 days with the subacute form and in three days with the acute form.

Under natural conditions, the infection seemed to be transmitted by contact while, experimentally, it could be reproduced by the inoculation of spleen emulsion from infected animals by the ordinary methods.

The cause of the disease was a short Gram-negative bacillus showing morphological resemblance to bacteria of the influenza group and requiring serum for the promotion of growth.

The disease could be distinguished from ectromelia and *Pasteurella muriseptica* infection.—S. J. EDWARDS.

Bennetts, H. W. (1933). **The Active Immunization of Sheep against Infectious Entero-toxaemia (Braxy-like Disease) by means of *B. ovitoxicus* Anaculture.**—*J. Sci. & Indust. Res. Australia.* **6.** 92-98. 3 tables. [5 refs.]

This article records experiments in the field and laboratory, which are a continuation of previous work by the author [this *Bull.* **3.** 530]. During 1931 and 1932 some 26,000 sheep were vaccinated with formalinized culture of *B. ovitoxicus* [*Clostridium ovitoxicum*]. Two subcutaneous injections were given, the first dose being 5 c.c. followed three weeks later by 10 c.c. Where possible, only half of each flock was vaccinated, the other half serving as controls. As a result of vaccination, mortality due to entero-toxaemia was reduced by 85 per cent. Lambs which were being fattened on peas were protected from the disease as effectively as were adult sheep. In addition to the reduction in mortality, the vaccinated animals on several properties thrived better than did the untreated. Vaccines prepared from certain highly toxic strains of the organism gave greater protection than vaccines prepared from strains which were weakly toxicogenic.

Immunization experiments were conducted in the laboratory with alum-toxoid, but this did not prove superior to the formalinized culture. It was also demonstrated that vaccine prepared from the bacillus of lamb dysentery conferred no immunity to *Cl. ovitoxicum* infection.—W. I. B. Beveridge.

I. Roberts, R. S. (1933). **The Practical Value of the Heat-Stable Antigen of *C. chauvoei* as an Immunising Agent.**—*J. Comp. Path. & Therap.* **46.** 56-61. 4 tables. [4 refs.]

II. Henderson, D. W. (1933). **Studies on *Clostridium chauvoei*. III.—Passive Protection with Pure " O " Sera.**—*Brit. J. Exp. Path.* **14.** 108-112. 1 table. [4 refs.]

I. The author carried out two preliminary experiments with guinea pigs to determine the immunizing value of the heat stable or somatic component of *Cl. chauvoei*. Antigen was prepared according to the method of Robertson and Felix. An ovine strain of *Cl. chauvoei* was cultivated in 0·5 per cent. glucose broth ; the bacilli were collected by centrifuging and, after an opacity standardization of the suspension, were heated for two hours at 100°C. In the first experiment four groups of four guinea pigs were inoculated with antigen which had been diluted 1 : 5. The animals of two groups were inoculated in each case with two doses, those of the one group receiving 2·5 c.c. doses and those of the other group 0·25 c.c. doses, the interval between the doses being a fortnight. The other two groups received single inoculations, the one 5 c.c. and the other 0·5 c.c. A spore suspension, prepared from broth cultures which had been kept for some time in the cold store, was used in the test for immunity. The dose of this was 0·3 c.c. of a 1 : 1,000 dilution to which had been added 0·3 c.c. of a 5 per cent. solution of calcium chloride, as activator. The test was carried out 14 days after the completion of the immunizing injections. Control guinea pigs were included in the experiment. One guinea pig out of each group and two out of six control animals failed to withstand the test inoculation, indicating that the above doses of antigen had produced no evidence of immunity.

In the second experiment the guinea pigs were given 1, 2, and 2 c.c. of undiluted antigen on three alternate days. Immunity was tested 14 days after the completion of the immunizing injections with 0·25 c.c. or 0·1 c.c. of old culture which had been kept in the cold store for several weeks. Three out of 11 vaccinated and 9 out of 11 control animals succumbed to the test inoculation. Evidence of immunity was thus obtained, in that 72·7 per cent. of the vaccinated as against 27 per cent. of the controls survived the test inoculation. The author discusses work which

had been carried out by HENDERSON and disagrees with him with regard to the value of this type of antigen as an immunizing agent. As the results were not encouraging the author states that it is unlikely that somatic antigen would be of practical value in the immunization of farm animals.

II. Continuing his studies with the O or somatic compound of *Cl. chauvoei*, the author obtained two pure O sera from goats which had been immunized with O antigen. Passive protection experiments were carried out with mice. The immune serum in 1 c.c. quantities was inoculated intramuscularly in the leg 24 hours previous to testing with the infecting suspension, which was also given intramuscularly in the opposite leg.

In the first experiment, using serum from goat II immunized with the ovine strain M7, evidence of immunity was obtained in that out of 14 mice receiving the lowest dilution of the infecting suspension, 6 survived ; of 14 receiving the intermediate dilution, 8 survived, while of 11 receiving the highest dilution, 8 survived. The mice which succumbed showed a longer survival period than the control mice which all died. The infecting suspension in this experiment was prepared from the bovine strain G1.

The serum from goat I, which had been immunized with the bovine strain G1 was found to have less protective value than that from goat II. Protective power was established, in that 50 per cent. of the mice treated with goat I serum survived the lowest dilution of the infecting suspension, while with the intermediate dilution 25 per cent. of the mice survived. In this experiment the homologous strain of G1 was used for the test infection.

Agglutination tests with these two sera were carried out. With goat II serum O agglutinins were present to a titre of 1 : 1,250 to 1 : 1,500 for both homologous and heterologous antigens. With goat I serum the O agglutinins were present to a titre of 1 : 1,000 for both strains.

The author states that the protective power of these O sera was lower than the protective power of O antigen which had been used in the active protection of guinea pigs in previous experiments. He is of the opinion that better results could have been obtained had an attempt been made to produce sera of maximum potency or to separate concentrated globulin fractions from the sera.

—D. R. WILSON.

McEWEN, A. D. (1933). **"Struck." Enteritis and Peritonitis of Sheep caused by a Bacterial Toxin Derived from the Alimentary Canal. Paper 2.**—*J. Comp. Path. & Therap.* **46.** 108-125. 3 tables. [1 ref.]

In the spring of 1930 an investigation was made as to the cause of deaths amongst sheep in the Romney Marsh. The layman called this disease " struck " and the name was retained by the author. It was attributed to a *B. paludis* [*Clostridium paludis*] toxaemia, the toxin being derived from the alimentary canal and generally associated with an invasion of the tissues by *Cl. paludis* [see McEWEN & ROBERTS, this *Bull.* **1.** 204].

This paper describes a series of experiments designed to set up the disease " struck " in experimental animals. It was found that the disease could be reproduced by the feeding of very large doses of a broth culture of *Cl. paludis* or with smaller quantities of culture, which were centrifuged and enclosed in a gelatin capsule.

" Struck " is said not to occur amongst lambs in the Romney Marsh. Three suckling lambs remained well when fed with cultures of *Cl. paludis*.

The possibility of vaccinating sheep against the disease has been studied. Sheep inoculated with anatoxin or anaculture showed considerable variation in

their immunity to artificial infection. The ability to withstand infection was found to depend upon the quantities of antitoxin present in their sera.

Field vaccination experiments have not been satisfactory because of the comparative absence of the disease during the years 1931 and 1932.

—A. J. Wilsdon.

Johnk, M. (1933). Ueber Rauschbrand und Gasbrand. [**Blackleg and Gas Gangrene**].—*Berl. tierärztl. Wschr.* **49.** 325-329.

The author describes in some detail the histories of 12 cases of blackleg in cattle, including the *post-mortem* findings. He considers that, in making a *post-mortem* diagnosis of this disease, reliance should not be placed on the characters of kidney and liver lesions as they are not specific and may be absent. He attaches more importance to the congestion and fibro-gelatinous exudate of the pleura and pericardium. In combating the disease, all susceptible animals should be inoculated with toxic filtrate in addition to the isolation of infected animals.—E. J. Pullinger.

I. Wallace, G. I., & Park, S. E. (1933). **Microbiology of Frozen Foods. V. The Behavior of *Clostridium botulinum* in Frozen Fruits and in Vegetables.**—*J. Infect. Dis.* **52.** 150-156. 1 table. [3 refs.]

II. James, L. H. (1933). **Effects of Freezing on the Spores and Toxin of *Clostridium botulinum*.**—*Ibid.* 236-241. 3 tables. [5 refs.]

I. This paper gives details of experiments undertaken to determine whether botulism could occur through the agency of frozen foods. Although the experiments revealed that the spores and toxin of *Cl. botulinum* are resistant to freezing, there would appear to be very little risk of botulism if the fruit or vegetables are canned properly and used immediately after defrosting. It was also shown that toxin production did not occur in the interval between canning and freezing, but if foods, particularly frozen vegetables, were kept after thawing for several days at room temperature before being used, they might become very dangerous.

II. This investigation revealed, as in the previous paper, that freezing neither kills the spores nor reduces in strength the toxin of *Cl. botulinum*. This finding, however, according to the author

" should not be construed as indicating that defrosted frozen-packed fruits and vegetables are necessarily dangerous to health. Fortunately, toxin does not as a rule develop in such products except in company with excessive decomposition, and then only if the materials have been grossly mishandled and have become unfit for consumption regardless of their botulinus content."

—Gwilym O. Davies.

van der Maas, D. (1932). Botulismus bij Paarden. [**Botulism in Horses**].—*Tijdschr. Diergeneesk.* **59.** 1040-1042. [Summaries in English, French and German : abst. from orig.]

Description of illness clinically resembling botulism in four horses, considered to be due to the ingestion of sugar beet-top ensilage.

—B. J. C. te Hennepe (Rotterdam).

Kraneveld, F. C., & Djaenoedin, R. (1932). Anaërobe bacillen en de door hen veroorzaakte infecties bij de huisdieren in Nederlandsch-Indië. IV. Enkele korte beschouwingen over de osteomyelitis bacillosa bubalorum naar aanleiding van de in 1930 aan het Veeartsenijkundig Instituut ter onderzoek ontvangen gevallen. V. Het voorkomen van den gasbacil van Fraenkel in den darminhoud bij rund en karbouw. [**Anaerobic Bacilli and the Infections caused by them in Domestic Animals in the Dutch East Indies. IV. Notes**

on Osteomyelitis Bacillosa Bubalorum from Cases notified at the Veterinary Institute in 1930. V. The Occurrence of *Clostridium welchii* in the Intestinal Contents of Cattle and Buffaloes].—*Ned.-Indisch. Blad. Diergeneesk.* **44.** 1-10 and 125-132. [Summaries in English of V, in German of IV and V ; abst. from orig.]

KRANEVELD, F. C. (1932). Anaërobe bacillen en de door hen veroorzaakte infecties bij de huisdieren in Nederlandsch-Indië. VI. Over gasoedemen bij runderen veroorzaakt door den bacillus phlegmones emphysematosae Eug. Fraenkel. [**Anaerobic Bacilli and the Infections caused by them in Domestic Animals in the Dutch East Indies. VI. Gas Oedema in Cattle caused by Fraenkel's Bacillus** (*Cl. welchii*)].—*Ibid.* 133-139.

IV. This disease is not uncommon in buffaloes, the bones of the forearm or of the thigh being most commonly affected. Experiments on four animals are described. The infection from the bone marrow tends to break through the shafts and cause an abscess in the adjacent muscle. In one case the tibia was affected, infection probably having passed by the blood stream, and in another animal the elbow joint was affected following abscessation from the humerus.

It is suggested that blood parasites may predispose to this disease.

V. *Cl. welchii* is of very common occurrence in soil, water, etc., and occurs regularly in the intestinal tract of human adults. This work was performed in order to find whether the organism occurs in the intestines of cattle and buffaloes. For this purpose 25 cattle and 25 buffaloes were examined. Cultures were prepared from the rectal contents of these animals and were positive in every case.

The pathogenicity of this gas bacillus was tested on guinea pigs in which it caused a typical gas oedema. Old cultures became non-pathogenic.

VI. In two cases of gas oedema in cattle, *Cl. welchii* was isolated from the muscle tissue. In one case there was a large lesion in the throat region.

—A. KLARENBEEK (UTRECHT).

KRANEVELD, F. C. (1933). Anaërobe bacillen en de door hen veroorzaakte infecties bij de huisdieren in Nederlandsch-Indië. VIII. Vergelijkend onderzoek over de koolhydraat-splitsing tusschen den bacillus gigas, Zeissler en Rassfeld en het uit gevallen van osteomyelitis bacillosa bubalorum geisoleerde organisme. [**Anaerobic Bacilli and the Infections caused by them in Domestic Animals in the Dutch East Indies. VIII. Comparative Research of the Fermentation of Carbohydrates between *Bacillus gigas* Zeissler and Rassfeld and the Organism isolated from Cases of Osteomyelitis Bacillosa**].—*Ned.-Indisch. Blad. Diergeneesk.* **45.** 80-95. 3 tables. [9 refs.] [Summaries in English and German : abst. from orig.]

Kraneveld made a study of the relation between the anaerobic bacillus, isolated from osteomyelitis bacillosa of buffaloes in the Dutch East Indies, and *B.* [*Clostridium*] *gigas* described by ZEISSLER and RASSFELD in the former's laboratory at Altone. This study was continued in the Dutch East Indies, where the same properties were found in both organisms with regard to carbohydrate fermentation. The bacilli, however, differ in virulence ; this is explained by the supposition that these micro-organisms and also *B.* [*Clostridium*] *oedematiens* (Bact. No. II. Novy) and the " black disease " bacillus of Australia (TURNER) belong to one group, namely the " Novy group " as proposed by MIESSNER, MEYN and SCHOOP [(1931). *Zlb. Bakt. I.* (*Orig.*). **120.** 257].—A. KLARENBEEK (UTRECHT).

SYKORA, F. (1932). Bakteriální flora v zdravém a nemocném genitálním ústrojí

skotu. [**The Presence of Bacteria in Healthy and Diseased Genital Organs of Cattle**].—*Klin. Spisy Skoly Zverol. Brno.* **9.** 1-35. [46 refs.] [Summary in German : abst. from orig.]

The author describes his findings in an examination of bacterial flora isolated from the genital organs of 62 cows. He found no difference, as regards the number of species obtained by cultivation, between the bacterial flora from the vaginas of cows with healthy genital organs and that from the vaginas of cows with diseased genital apparatus. It was noticed that the cultures of bacteria from healthy vaginas grew more slowly than the cultures from diseased vaginas. The mucus from the cervix uteri of cows with healthy genital organs was sterile in 25 per cent. of cases ; in 75 per cent. of cases, cultures of *Staphylococcus aureus* were isolated, but in very low numbers. From the exudate of the cervix uteri of animals with diseased genital organs, the following bacteria were isolated :—*S. aureus* (83 per cent. of cases), *S. albus* (33 per cent.), *S. citreus* (16 per cent.), streptococcus (33 per cent.), coliform bacilli (50 per cent.), and Gram-negative bacilli (33 per cent.).

From the contents of pathologically changed uteri were cultivated :—*S. aureus* (66 per cent. of cases), streptococcus (50 per cent.), *Bact. pyogenes* (16 per cent.), *S. albus* (16 per cent.), and Gram-negative bacilli (16 per cent.). The uterine secretions of healthy cows were sterile in 40 per cent. of cases, *S. aureus* was cultivated in 40 per cent. of cases, streptococci and coliform bacilli in 20 per cent. of cases.—E. Pribyl (Brno).

Meinicke, H. (1932). Die Mikrobenflora in der Mundhöhle, in den Tonsillen und den zugehörigen Kopflymphknoten der Schweine. [**Bacterial Flora in the Oral Cavity, the Tonsils and the Accompanying Lymph Glands of the Head of Swine**].—*Inaug. Diss. Hanover.* pp. 32. 10 tables. [20 refs.]

Erysipelothrix rhusiopathiae was isolated from 5 out of 75 normal pigs, and organisms of the *Pasteurella* genus were isolated from 95 out of 186 pigs.

Mucous material from the oral cavity and tonsillar fossa, and pharyngeal and retropharyngeal lymphatic gland material was examined culturally as well as by injection into mice.—E. J. Pullinger.

I. Winkler, W. (1933). Der Keimgehalt der Milch und die normalerweise im Euter vorkommenden Bakterien. [**The Bacterial Content of the Milk and the Bacteria occurring in the Udder of the Cow**].—*Zlb. Bakt. I. (Ref.).* **108.** 381-382. [Paper presented at Meeting of Vienna Microbiological Society, November 22nd, 1932].

II. Diernhofer, K. (1933). Untersuchungen über die Bakterienflora des gesunden und kranken Kuheuters. [**Investigations into the Bacteria of the Healthy and Diseased Udder of the Cow**].—*Ibid.* 382-383.

I. In Austria, first grade milk has to contain less than 10,000 organisms per c.c. In Vienna, pasteurized milk shows an average of 100,000 to 200,000 bacteria per c.c., while raw milk usually contains from two to three million bacteria. Grading of milk has resulted in marked improvements both in stock and dairy management. The strainers now used are one-sided naped cloths ; this reduces the bacterial count to about 30 per cent. In the second part of his paper the author gives a general brief survey of the bacteria occurring in the udder.

II. A recent investigation into the incidence of streptococci in the udder of 452 cows has shown that the streptococci were present in one or more quarters of 204 (45 per cent.) of the animals tested. 180 strains of streptococci were isolated from udders and proved to be :—157 strains of *Str. agalactiae*, of which 38 were haemolytic and 119 non-haemolytic ; 4 strains of *Str. pyogenes* ; 2 strains of

Str. dysgalactiae ; 9 strains of *Str. uberis* ; 3 strains of the *Str. lactis* group and 5 atypical strains which showed marked differences from the above as well as from each other. The differentiation of the strains should be based mainly on their biochemical characters. The typical and so-called " atypical " strains of *Str. agalactiae* are considered to be the R and S forms respectively.

Micrococci other than streptococci could be isolated from 135 of 386 cows tested. The differentiation of the strains showed at least 12 different groups of which only one could be definitely identified as *Str. aureus*. *Str. aureus* produces " galt-like " lesions in the udder.

Udder corynebacteria are often met with and produce no irritation of the organ. As stressed in the discussion by the author, the corynebacteria isolated were distinctly different from *Corynebact. diphtheriae* and *C. bovis*.

It is believed that *Br. abortus* does not produce lesions in the udder, or only very slight ones, and it cannot be demonstrated by the routine chemical and physical tests used in milk examinations. 97 per cent. of the excretors showed a positive (1 : 100) blood titre ; of the remaining 3 per cent., one-third was recognized by a positive milk titre.

Mycobact. tuberculosis is distinctly different from the bacteria named above with regard to the nature of its parasitism to the tissues : it is never present as a saprophyte. Frequent and thorough inspections of dairy herds are considered to be the only sure methods of combating tuberculous mastitis.

—R. Wetzel (Hanover).

Garrod, L. P (1933). **On So-called Reversed Selective Bacteriostasis.**—*Brit. J. Exp. Path.* **14.** 182-189. 3 figs., 1 table. [14 refs.]

Since the work of Churchman in 1912 and 1913, it has been recognized that gentian violet and other dyes of this type have a selective bactericidal action depending upon the greater susceptibility of Gram-positive organisms. In 1923 Churchman claimed the existence of another phenomenon known as " reversed selective bacteriostasis " and that acid fuchsin and certain other chemical substances had a reverse selective action, destroying Gram-negative organisms with greater rapidity than Gram-positive organisms. In the experiments on which he based his claim, Churchman worked with a mixed culture of *B. anthracis* and *Pseudomonas aeruginosa* [*Ps. pyocyanea*], but according to the author of this paper " he fails to state, however, whether the preparations of *B. anthracis* used in his experiments contained spores " and yet from the details which are given the author says it is reasonable to assume that spores may have been present and that what Churchman took to be reverse selective action could be explained on the basis of spore resistance.

In this paper the author details his own experiments to confirm or refute Churchman's findings, and in the light of his results is led to conclude that his assumption is correct and that the survival of *B. anthracis* was due to the presence of spores. He found that " vegetative *B. anthracis* and other Gram-positive bacteria are destroyed with greater rapidity by acid fuchsin and by acriflavine than are Gram-negative bacteria. The reversal of selective bactericidal effect in accordance with the Gram-staining reaction which this dye and other chemically related substances have been said to exhibit does therefore not exist." Furthermore, it is known that mere exposure to a temperature of 45°C., at which Churchman states acid fuchsin exerts its effect, is in itself lethal for vegetative *B. anthracis* and *Ps. pyocyanea*.—Gwilym O. Davies.

I. Schilling, C. (1933). Antagonismus bei Bakterien. 2. **[Bacterial Antagonism. 2.]**.—*Zlb. Bakt. I.* (*Orig.*). **127.** 276-279. [1 ref.]

II. Acs, L. (1933). Ueber echte mitogenetische Depressionen. Bakterienantagonismus und mitogenetische Strahlung. [**True Mitogenetic Depression. Bacterial Antagonism and Mitogenetic Irradiation**].—*Ibid.* 342-350. 4 tables, 4 graphs. [3 refs.]

I. A strain of *Corynebact. diphtheriae* together with ten strains of other organisms were isolated from a patient's throat. Twelve days later, culture of a throat swab revealed no diphtheria organisms and a considerable change in the flora of the throat. Amongst the new strains which appeared was a haemolytic coccus called C2. If cultures of the above diphtheria strain and C2 organisms were mixed the former died out within 48 hours. The possibility of this being a pH effect was excluded.

Mixtures of the diphtheria and C2 organisms inoculated into guinea pigs revealed a marked lowering of virulence of the former when compared with control guinea pigs. The C2 organism showed a varying degree of antagonistic activity when mixed with different strains of diphtheria bacilli.

With a view to the practical application of this antagonism to healthy diphtheria carriers, an attempt was made to establish the C2 organism in the throats of volunteers without success.

II. The author has demonstrated a type of bacterial antagonism. If a culture of *B. anthracis* is exposed near [5 to 10 m.m.] to a culture of *Pseudomonas pyocyaneus* for a few hours, the multiplication of the former is markedly slowed down or even brought to a standstill as compared with a control culture kept apart from the *Pseudomonas*. All contact between the cultures including gaseous interchange is avoided. Bacilli from a culture of which the growth has been slowed down in this fashion show degenerative changes if examined microscopically. Similar effects to the above, using other pairs of organisms, are described. In a section unsuitable for abstraction the author discusses his reasons for believing that he is studying the effect of true mitogenetic irradiation causing a depression of mitosos. [For the reverse process see this *Bull.* **2.** 533].—E. J. Pullinger.

Coyne, F. P. (1933). **The Effect of Carbon Dioxide on Bacterial Growth.**—*Proc. Roy. Soc. London. Ser. B.* **113.** 196-217. 11 tables. [19 refs.]

This investigation was conducted with particular reference to the preservation of fish, it being known that fresh fish on board trawlers can only be kept reasonably fresh, when packed in ice, for a maximum period of 10 to 12 days. Deterioration is due to bacteria, probably members of the genus *Achromobacter* which preponderate in fish slime and which the author has shown to be capable of rapid growth at 0°C. when air is present.

By growing cultures, chiefly of the genus *Achromobacter*, isolated from the surface slime and intestines of fresh fish in the presence of different amounts of carbon dioxide (5 per cent. to 100 per cent.) at 0°, 10°, 25° and 37°C., it was found that " in general carbon dioxide exercises an inhibitory action on growth varying from complete inhibition in some cases to an almost negligible effect in others. At temperatures below the optimum for growth the influence of carbon dioxide is invariably more marked. In 20 per cent. carbon dioxide at 0°C. growth of those bacteria responsible for the spoilage of fresh fish is almost completely inhibited."

—Gwilym O. Davies.

—. (1933). **Hormonal Integration of Bacteria.**—*J. Amer. Med. Ass.* **100.** 502-503. [2 refs.]

A brief comment is made on the work of Miller [this *Bull.* **3.** 65.] who, working with six strains of mycobacteria, made them grow as non-acid-

fast organisms by the addition to the culture media of a filtered extract of a chromogenic strain of tubercle bacillus. This extract produced an accelerated growth of the test strains followed by both macroscopic and microscopic changes and differentiation into non-acid-fast forms. After transfer to media suitable for acid-fast growths, four strains reverted not only to acid-fastness but to their original cultural characteristics.—R. Lovell.

Thompson, L. (1933). **Actinobacillosis of Cattle in the United States.**—*J. Infect. Dis.* **52.** 223-229. 1 fig., 3 tables. [11 refs.]

Although actinobacillosis was not recorded in the United States until 1932, there seems to be no doubt that the condition is equally as common there as in European countries. The lesions described by the author resemble those found by observers in other countries.

The author examined lesions from 28 cattle, 23 of which proved to be due to *Actinobacillus lignieresi* and five due to *Actinomyces bovis*. In all the cases of actinobacillosis the lesions were found in glands or in the tongue, whereas *Actinomyces bovis* was isolated from two jawbone lesions, two gland lesions and from a head sinus. A comparative study was also made of a strain of *Actinobacillus lignieresi* from a human source.

The author states that agglutination and absorption of agglutinins indicate that there is considerable antigenic variation among strains of *Actinobacillus lignieresi* and it is also his experience that the agglutination test could not be relied upon to detect infection among cattle.—Gwilym O. Davies.

Novak, M. V., & Henrici, A. T. (1933). **Pleomorphic Organism showing Relationships between Staphylococci and Actinomycetes.**—*J. Infect. Dis.* **52.** 253-267. 10 figs. on 1 plate. [12 refs.]

In the Berkefeld filtrate derived from a saphrophytic actinomyces culture, there appeared, after five weeks storage at room temperature, a cloudy growth the nature of which was shown, morphologically and culturally, to be a typical staphylococcus.

On the surface of agar the organism gave rise to yellow colonies which, after six days incubation at 37°C., developed a filamentous edge extending into the deeper layers of the medium. This fringed edge was precisely like the radiating filaments of the mycelium of an actinomyces organism, but was composed of pure coccoid forms. On dextrose agar, rods and branching filaments were produced from the coccoid forms, while filaments and rods reverted to cocci when transferred to plain agar.

S and R colonies were obtained from cultures of the yellow staphylococcus, rod and coccoid forms appearing in both varieties. A third variant, consisting of minute opaque colonies similar to the G forms of Hadley, developed from old cultures.

It is suggested that the observations support the theory that the staphylococci are related to the actinomyces.—S. J. Edwards.

I. Hoogland, H. J. M. (1932). Mucor-mycose bij een varken. [**Mucor Mycosis in a Pig**].—*Tijdschr. Diergeneesk.* **59.** 1156-1163. [Summaries in English, French and German : abst. from orig.]

II. Baudet, E. A. R. F. (1932). Mucor pusillus Lindt als oorzaak van mycose bij het varken. [*Mucor pusillus* **Lindt as the Cause of Mycosis in a Pig**].—*Ibid.* 1163-1164. 5 figs. on 2 plates. [Summaries in English, French and German : abst. from orig.]

I. The liver and kidney of a three-month-old slaughtered pig were sent to the Pathological Institute, University of Utrecht, for inspection and showed pathological changes due to fungus infection. Nodular areas, 2 to 2·5 cm. in diameter, were disseminated on the liver and kidneys and in addition a few haemorrhagic infarcts were present in the latter. Microscopic examination showed *mucor* infection in the inflammatory areas of both organs. The hepatic distribution suggested that the organism was distributed with portal blood from the intestine. Blood vessels and the larger bile-ducts of the liver and the glomeruli and tubules of the kidneys contained mycelia. The process seemed to be at an acute stage.

II. *Mucor pusillus* Lindt was identified from the above case. A rabbit was injected intravenously with 0·5 c.c. of a 14-day-old culture and died within five days. At *post-mortem* examination the kidneys showed multiple minute areas containing mycelia.—J. VAN DER HOEDEN (UTRECHT).

DISEASES CAUSED BY PROTOZOAN PARASITES.

STYLIANOPOULOS, M., & ANANIADÈS, B. (1933). Contribution à l'étude des piroplasmoses en Grèce. III. Babésiellose du mouton. [**The Study of Piroplasmoses in Greece. III. Babesiasis of Sheep**].—*Bull. Soc. Path. exot.* **26.** 704-709. [2 refs.]

Babesiasis is widespread in Macedonia and western Greece and appears as a benign disease of local sheep, but causes heavy losses in imported animals. The disease may be acute or peracute and the latter form may be mistaken for anthrax. The acute form is characterized by fever, anaemia, rapid respiration and constipation followed by diarrhoea. Haemoglobinuria and jaundice are not constant symptoms. The mortality varies from 15 to 80 per cent., being greatest in lambs. On autopsy, the body cavities are filled with a pinkish exudate and the lungs are oedematous and may show catarrhal pneumonia. The spleen is enlarged, the liver enlarged and friable, the kidneys congested and the external lymphatic glands enlarged.

The parasites are seen in the blood in annular, pyriform or anaplasmoid forms, the two former being 1·25μ to 2·8μ in diameter. Babesia can be detected in the blood from the capillaries of the bone marrow three days after the death of the animal.

The red cell count is sometimes reduced to 3,500,000 per c.mm. and anisocytosis and poikilocytosis are encountered. The incubation period, after inoculation, is four days. For treatment urotropine is recommended : 15 g., diluted 20 per cent., should be inoculated subcutaneously night and morning for two to three days. If treatment is undertaken early the mortality is negligible.

—U. F. RICHARDSON.

I. —. (1933). **The Occurrence of Anaplasmosis in Cattle in North Australia.**—*J. Sci. & Indust. Res. Australia.* **6.** 63.

II. LEGG, J. (1933). **The Occurrence of** *Anaplasma marginale* **Theiler 1910 in Northern Queensland.**—*Council Sci. & Indust. Res. Australia. Pamphlet.* No. 38. pp. 31. 2 figs. on 1 plate, 2 charts. [20 refs.]

I. A preliminary note on the work described in II.

II. This is a preliminary survey of the protozoan blood parasites affecting bovines in the tick-infested areas of Australia. Hitherto *Piroplasma bigeminum* [*Babesia bigemina*] has been the only parasite of this nature that has been definitely identified. The occurrence of *Anaplasma marginale* and *Theileria*

mutans is now recorded. Pure infections with each of these three protozoa have been set up in calves, the symptoms observed and cross-infection experiments carried out. The results conform closely with those obtained in other countries. *B. bigemina* is the cause of the condition known as redwater, while *Th. mutans* appears to be of little or no pathogenic importance. Infection with *A. marginale* produces a slow, progressive disease with marked anaemia and loss of condition, but haemoglobinuria does not occur. Premunition against *B. bigemina* produces no resistance to infection with the anaplasm and *vice versa*. These observations are of great importance to the tick-infested areas of Australia, where premunization has frequently caused losses and failed to give protection, owing to the unsuspected presence of the anaplasm. Details of the inoculation experiments are given in an appendix.—W. I. B. Beveridge.

Alcorn, L. M. (1933). **Anaplasmosis and Its Spread in Kansas.**—*Vet. Med.* **28.** 234-237. [10 refs.]

The symptoms and *post-mortem* findings of this disease as it occurs in the U.S.A. are described ; they do not differ markedly from the classical descriptions. *Rhipicephalus sanguineus* is considered to be the usual transmitter, but the possibility of horse flies acting as carriers of the disease is discussed. Intravenous injections of sodium cacodylate in a 12·5% solution (dosage 80 to 180 grains) is suggested as a helpful treatment. [The prophylactic inoculation of cattle with avirulent strains of anaplasmosis is not discussed].—E. J. Pullinger.

Gousseff, W. F. (1933). Zur Frage der Coccidien der Füchse in Transkaukasien. [**On Coccidia of the Fox in Transcaucasia**].—*Arch. wiss. prakt. Tierhlk.* **66.** 424-428. 6 figs., 2 tables. [6 refs.]

This article records the finding of coccidia in the excrement of foxes used for experiment in Transcaucasia. Round, oval and oviform varieties were encountered which resembled *Isospora rivolta*, *Eimeria vulpis* and *I. felis* respectively.—U. F. Richardson.

Schwetz, J. (1933). Sur les parasites malariens (*Plasmodium*) des Singes inférieurs africains. [**On the Malarial Parasites (Plasmodium) of the Lower Monkeys of Africa**].—*C. R. Soc. Biol. Paris.* **112.** 1220-1222.

Malarial parasites were found in the blood of 65 per cent. of monkeys from the country round Stanleyville, Belgian Congo, four different species of monkeys being affected. The parasites concerned all belonged to one species of *Plasmodium* which differed from the classical description of *Pl. kochi* in that the schizonts were not hypertrophied and did not show Schuffner's granulation or pigment. The author suggests that either a new name must be given to this parasite or the classical description of *Pl. kochi* must be revised. The article also describes fully the schizonts and gametes of the parasite encountered.—U. F. Richardson.

Troisier, J., & Monaldi, T. de S. (1933). L'Hématozoaire du paludisme passe-t-il à travers les filtres ? [**Is the Malaria Parasite Filtrable?**]—*C. R. Soc. Biol. Paris.* **113.** 347-350. [1 ref.]

This article records attempts to infect human beings by the inoculation of filtered blood and cerebrospinal fluid of malarial patients, using *Br. abortus* as a control of the filtration. No infection was produced and the subjects were afterwards proved susceptible to malaria by the inoculation of virulent unfiltered blood.—U. F. Richardson.

Aragao, H. de B. (1933). Considérations sur les Hémogrégarines des Oiseaux. [**The Haemogregarines of Birds**].—*C. R. Soc. Biol. Paris.* **113.** 214-215.

This is a further report on the haemogregarines of canaries in Brazil. The parasite is very similar to that found in the European sparrow. A description of the organisms is given and the name *Haemogregarina serini* is proposed. The organism in the adult stage is most frequently found in the lungs and peripheral blood and in the young stages it is most common in the liver, lungs and bone marrow. The organisms are distinguished from toxoplasms as they are motile, specific for host species and non-pathogenic.—U. F. Richardson.

Bennett, S. C. J. (1933). **The Control of Camel Trypanosomiasis.**—*J. Comp. Path. & Therap.* **46.** 67-77 and 174-185. [12 refs.]

This article records work carried out in the Sudan since early in 1927 to develop a routine system of control for trypanosomiasis of camels. The trypanosome involved is *Trypanosoma soudanense* which is a local strain of *T. evansi* and is transmitted by tabanid flies. Infection of camels occurs during the rainy season and is regional, being confined to those areas which are not too damp for camels and not too dry for tabanids.

The method of control adopted is the examination of camels, during and at the end of the rainy season, by the mercuric chloride test and the treatment of infected animals with " naganol." The mercuric chloride test proved more reliable than microscopic examination or the formol-gel test, both in the laboratory and in the field. One drop of serum from the animal to be tested is added to 1 c.c. of 1 : 25,000 solution of mercuric chloride in water, and the result can be read in a few moments. Out of 300 clean camels examined, only two gave reactions and these were faintly positive. The reaction develops within two to three weeks of infection and it does not disappear unless the animal has been treated and cured. Dried serum retains its positive or negative property and serum can be dried in drops on blotting paper and soaked out in distilled water for testing.

Early work on treatment indicated that a dose of 10 g. of naganol was required to effect a cure and that even this dose was not always reliable. Later work has indicated that a dose of 4 g. is sufficient. The difference may depend upon a greater purity of the drug as now issued. Little or no immunity follows recovery after treatment. In some cases immunity only lasted for three months ; it may depend mainly upon the prophylactic value of naganol which in 4 g. doses will protect for about two months, and in 10 g. doses for about four months.

The role of horses and donkeys as carriers of *T. soudanense* was investigated. Horses suffered an acute disease and died in six months, but donkeys acquired a chronic infection with no marked symptoms and may act as carriers. It is suggested that donkeys attached to camel units should be treated with naganol which is curative in these animals in a dose of 1 g.

Infections of camels with *T. brucei*, *T. vivax*, *T. rhodesiense* and *T. congolense* are rare, as camels are seldom exposed in tsetse areas. A few investigations were undertaken and it was found that in cases of infection by the first two a positive reading was given with the mercuric chloride test. The first three yielded to naganol treatment, but a case of *T. congolense* infection resisted treatment with this drug, and it is doubtful whether cure resulted from treatment with naganol and antimony.—U. F. Richardson.

Hornby, H. E. (1933). **Notes on Trypanosomiasis Research.**—*Ann. Rep. Dept. Vet. Sci. & Anim. Husb. Tanganyika. 1932.* pp. 24-28. 2 tables. [14 refs.]

An investigation, in collaboration with the Tsetse Research Department, into

seasonal movements of *Glossina pallidipes* in the neighbourhood of the Mpwapwa Laboratory has cleared up much of what was formerly mysterious concerning annual outbreaks of trypanosomiasis on the laboratory farms, and much infection which used to be ascribed to mechanical infection must now be put down to rare tsetse. Nevertheless it is urged that the probable importance as mechanical vectors of such flies as large *Tabanus* and *Pagonia* should not be ignored.

An attempt is made to place antimony therapy on a rational basis. Reviewing information from many sources, backed by personal observation, the conclusion is reached that (1) *T. congolense* is essentially a blood parasite, with a predilection for capillaries ; (2) the action of tartar emetic and antimosan on trypanosomiasis is direct ; (3) the drug action is independent of the destructive action of antibodies ; (4) on account of the inaccessibility of the trypanosomes (probably in closed capillaries), no dose or series of doses of the drug is likely to succeed in reaching and killing all the parasites in the body ; sterilization is generally dependent upon subsequent antibody action, and (5) although antibodies alone can and often do effect sterilization, their action is immensely assisted if the number of trypanosomes is reduced to a minimum by the action of a drug.

Reference is made to a small herd of apparently immune cattle which died out when moved to another part of the same fly-belt and, although it is not certain that trypanosomiasis was the cause of death, it is probable that it was. This supports previous experience relative to the inability of the zebu cattle of East Africa to develop a really serviceable state of immunity or premunization against all strains of trypanosomes.—S. A. Evans.

Hoare, C. A., & Coutelen, F. (1933). Essai de classification des trypanosomes des mammifères et de l'homme basée sur leurs caractères morphologiques et biologiques. **[The Classification of the Trypanosomes of Mammals and Man Based on their Morphological and Biological Characters]**.—*Ann. Parasitol.* **11.** 196-200. 1 table. [8 refs.]

The authors discuss the evolution of trypanosomes and classify them on the basis of their method of development in their invertebrate host and their morphology in the mammalian host. In this way the trypanosomes of mammals are divided into 5 groups, *lewisi*, *evansi*, *vivax*, *brucei* and *congolense*. A table is given which contains information as to the size, natural host, geographical distribution, cultivation, pathogenic importance and synonyms of each species.—U. F. Richardson.

Cordier, G., & Menager, J. (1933). De la valeur de certaines réactions sérologiques appliquées au diagnostic de la dourine. **[The Value of Certain Serological Tests applied to the Diagnosis of Dourine]**.—*Rev. vét. et J. Méd. vét.* **85.** 131-138. 2 tables. [5 refs.]

The prevalence of dourine in Tunis in 1930 to 1931 led the authors to make a series of experiments to try to find a simple serological test for the detection of early cases.

In order to avoid the difficulties which are met in preparing and keeping the antigens used by Watson and by Mohler and Reynolds, a complement-fixation test, similar in technique to the Calmette-Marsol test for tuberculosis, was elaborated. Three antigens were used : two were prepared from rabbits killed in the final stage of the disease, one from spleen and one from liver and the third was made from the heart of a donkey which died of dourine.

The results of the tests of sera from clinically affected and clinically healthy equines and from inoculated and control rabbits were unsatisfactory.

Two precipitation tests, one following the technique of the Vernes-Bricq-

Yvon test for syphilis and tuberculosis, the other following that of Targowla which has been applied to the diagnosis of human trypanosomiasis, were attempted. No precipitation was obtained with either.

Cernaianu's formol-gel test gave irregular results.—J. R. Hudson.

Coronel, A. B. (1933). **The Mercuric Chloride Test as an Aid to the Microscopic Diagnosis of Surra.**—*Gaz. Bureau Anim. Indust. Philippine Is.* **3.** 147-149. 2 tables. [1 ref.]

In view of the prevalence of carriers of surra which show few symptoms of the disease, it is important to have a test which will indicate infected animals in the absence of symptoms and in spite of negative results on microscopic examination of blood. Experiments were carried out with the mercuric chloride test (one drop of serum to 1 c.c. of a 1 : 20,000 solution of mercuric chloride) on 14 buffaloes which were known to be carriers of surra. Thirteen positive readings were obtained and one negative reading. The animal which gave a negative reading with the test was also negative on microscopic examination, whilst the animals positive to the test had been positive on microscopic examination at some period during the years 1931-1932. The author considers that the mercuric chloride test detects infection where microscopic examination fails.—U. F. Richardson.

Trensz, F., & Jardon, M. (1933). Les protides du sérum et la réaction de Henry dans la trypanosomiase expérimentale. [**Serum Proteins and Henry's Reaction in Experimental Trypanosomiasis**].—*Bull. Soc. Path. exot.* **26.** 442-444. [5 refs.]

Working with guinea pigs infected with *Tryp. berberum*, the authors found that the euglobulin of the blood began to increase 8 to 10 days after inoculation and that, later, there was a noticeable increase of euglobulin whilst the serum became positive to Henry's reaction and also exhibited the phenomenon of flocculation with distilled water. Whilst serum positive to Henry's reaction always exhibited a high euglobulin content, a high content of this protein might be accompanied by a negative reaction.—U. F. Richardson.

Galliard, H. (1933). Infections à *Trypanosoma duttoni* Thiroux chez les animaux splénectomisés. [**Infections by *Trypanosoma duttoni* Thiroux in Splenectomized Animals**].—*Bull. Soc. Path. exot.* **26.** 609-613. [6 refs.]

T. duttoni, which resembles *T. lewisi* but is adapted to the mouse, was used for these experiments to exclude *Bartonella* infections which complicated work on rats. It was found that with intraperitoneal infection 24 hours after splenectomy a more intense infection developed. The course of the disease remained normal if subcutaneous inoculation was practised 24 hours after splenectomy or if splenectomy was carried out after infection.—U. F. Richardson.

I. Launoy, L., & Prieur, M. (1933). Sur l'infection expérimentale du chat par *Trypanosoma annamense*. [**The Experimental Infection of Cats by *Trypanosoma annamense***].—*Bull. Soc. Path. exot.* **26.** 492-500. 4 graphs. [2 refs.]

II. Launoy, L. (1933). Recherches sur l'action préventive du 205 Bayer-309 Fourneau dans l'infection expérimentale du chat par *T. annamense*. [**Research on the Preventive Action of Bayer 205-Fourneau 309 in Experimental Infection of Cats by *T. annamense***].—*Ibid.* 501-506. 1 graph. [6 refs.]

I. *T. annamense*, a trypanosome of the *evansi* group from Annam, when

inoculated into four cats, caused either a rapidly fatal disease or a chronic disease. After an incubation period which never exceeded three days there was a heavy blood infection which was later broken by irregular negative periods. The symptoms shown were irregular fever, loss of weight, oedema of the eyelids, opacity of the cornea and keratitis.

II. Subcutaneous inoculation of 5 cg. per kg. body weight of pure Bayer 205, protected a cat from trypanosome infection for five months during which interval nine infective doses were administered. Smaller doses of the drug also protected, but for shorter periods.—U. F. Richardson

Katayama, N. (1933). Experimentelle Untersuchungen über die Infektion von Ratten mit Kulturformen des Trypanosoma Lewisi von der Maulschleimhaut aus. 1. [**Experimental Investigations on the Infection of Rats with the Cultural Form of *Trypanosoma lewisi* through the Oral Mucous Membrane. 1.**].—*Zlb. Bakt. I.* (*Orig.*). **128.** 125-129. 3 tables. [8 refs.]

Little difficulty was found in infecting white rats with cultures of *T. lewisi* by application to uninjured mucous membrane of the mouth, but infection with the blood form of the trypanosome could not be effected by this method. Infection occurred in every case when using young cultures (20 days old) in which blood forms had disappeared and crithidial and leptomonad forms predominated. When using 68-day cultures which contained degenerated forms, crithidia and small trypanosome forms, infection occurred in three only out of nine rats treated by application to the oral mucous membrane, and in two out of five animals treated by intraperitoneal inoculation. When using young cultures of trypanosomes subcultured to the 10th generation, an infection rate of only 50 per cent. was obtained.—U. F. Richardson.

Grillo, J. (1933). Experimentelle Untersuchungen über Misch- und Sekundärinfektion. 3. Ueber der Verlauf einer Infektion mit Trypanosomen und Rekurrensspirochäten beim Meerschweinchen. [**Experimental Research on Mixed and Secondary Infections. 3. On the Course of an Infection with Trypanosomes and Spirochaetes in Guinea Pigs**].—*Zlb. Bakt. I.* (*Orig.*). **128.** 252-265. 3 tables. [14 refs.]

Whilst some authors had recorded that a mixed infection with trypanosomes and spirochaetes profoundly influenced the course of the trypanosome infection in rats and mice, Velu and his co-workers recorded that a mixed infection with *Trypanosoma marocanum* and *Treponema hispanica* did not lead to a modification of the course of the trypanosome infection in guinea pigs. Working with *T. brucei* and *Trep. hispanica* in guinea pigs, the author records that, as a result of the mixed infection, the incubation period of the trypanosome infection was lengthened, there were frequent disappearances of the trypanosomes from the blood and the animals lived for much longer periods than controls infected by *T. brucei* alone.

It was observed that the trypanosomes appearing after the lengthened incubation period represented a relapse strain, which suggested that the altering of the course of the trypanosome disease depended upon the influence of the spirochaete in increasing unspecifically the precursors of specific immunity. The administration of colloidal copper, which is said temporarily to damage the reticulo-endothelial system, had the effect of shortening the incubation period of the trypanosome infection, but prolonging the life of the animal. It is suggested that in both cases the effect was due to a primary damage of the reticulo-endothelial system followed by an over-production of those cells upon which immunity depends.

—U. F. Richardson.

I. Anderson, C. (1932). Vue d'ensemble sur l'étude des Leishmanioses viscérales animales et l'état actuel du problème du Kala-Azar. [**A Comprehensive Survey of the Study of Visceral Leishmaniasis of Animals and the Present Position of the Kala-Azar Problem**].—*Algérie Méd.* **36.** 135-137. [3 refs.]

II. Balozet, L. (1932). Les prélèvements pour la recherche des Leishmanies. Technique de la ponction de la rate chez le chien. [**Collection of Material for the Detection of Leishmania. The Technique of Spleen Puncture in Dogs**].—*Bull. Acad. vét. France.* **5.** 317-320. [5 refs.] [Reported *verbatim* in *Arch. Inst. Pasteur, Tunis.* **21.** 341-346].

I. The author briefly reviews the history of the discovery of canine leishmaniasis and the work done on its relationship to human kala-azar and leishmaniases of other animals. The question of the insect transmitter is also discussed and it is pointed out that little more has been proved than that the virus will survive in a variety of insects as it will in normal saline.

II. The author emphasizes the necessity for demonstrating the organism before diagnosing canine leishmaniasis. The parasites are most numerous in the bone marrow and, after that, in the spleen and liver. For examination of the bone marrow, the tibia may be trephined, but the operation is painful, there is danger of fracture and examination cannot be repeated.

For puncture of the spleen a 5 c.c. syringe is used with a needle 5 c.m. long and 0·8 mm. in diameter. The animal is fastened in the ventral position with its legs stretched out. The needle is introduced at the point of intersection of the border of the last rib with a horizontal line bisecting the height of the chest, that is, at about the extremity of the last rib, and is directed slightly forwards and downwards. For puncture of the liver in large dogs a 6 cm. needle may be required.

With the dog in the ventral position, the needle is inserted in the tenth intercostal place, one or two fingers' breadth from the spine ; or with the dog in the dorsal position the needle is inserted at the right edge of the hypo-chondrium, two or three fingers' breadth from the middle line and is directed obliquely downwards and forwards.

The material obtained is blown out of the needle on to a slide and smeared and stained, but the utility of the measure is doubled if tubes of N.N.N. media are also inoculated.—U. F. Richardson.

Bos, A. (1933). Trichomonas van Mensch, Hond, Kat en Rund. [**Trichomonas of Men, Dogs, Cats and Cattle**].—*Tijdschr. Diergeneesk.* **60.** 421-422.

A note is given on the genus *Trichomonas*, which live especially in the cavities of the body (the intestines, mouth, vagina and bladder). Different species occur in human beings, dogs, cats and cattle. Individual species can sometimes be transmitted experimentally from one species of animal to another. Cases of human disease caused by trichomona are mentioned. In cattle the sexual function can be disturbed by vaginal infection. In human beings leucorrhoea can sometimes be caused by vaginal infection.—A. Klarenbeek (Utrecht).

I. Witte, J. (1933). Bakterienfreie Züchtung von Trichomonaden aus dem Uterus des Rindes in einfachen Nährböden. [**Bacteria-Free Culture of Trichomonads from the Uterus of Cattle on Simple Media**].—*Zlb. Bakt. I. (Orig.).* **128.** 188-195. 3 figs. [26 refs.]

II. Witte, J. (1933). Tierversuche zur Prüfung der Pathogenität der in den Genitalien des Rindes vorkommenden Trichomonaden. [**Animal Experi-**

ment in Investigating the Pathogenicity of Trichomonads found in the Bovine Genital Organs].—*Arch. wiss. prakt. Tierhlk.* **66.** 333-343. 1 table. [15 refs.]

III. Holstein. (1933). Trichomonadeninfektion bei Genitalerkrankungen des Rindes. [**Trichomonad Infection in Diseases of the Genital Organs of Cattle**].—*Tierärztl. Rdsch.* **39.** 465.

I. This paper records the cultivation of trichomonads from the uterine contents of a case of bovine pyometra. Pure cultures of the organism were obtained in peptone broth, to which 5 to 10 per cent. of defibrinated blood (horse, ox, sheep or goat blood) was added. At 37°C., growth appeared in 24 hours and reached its maximum in three days, whilst the motility of the organisms continued to the 8th or 10th day.

Subcultivation was successful, provided that it was carried out before movements of the organisms ceased, and one strain was maintained for 215 days. The organism was not particular as to the acidity of the medium ; growth occurred between pH 5·5 and pH 8·5. The organism was also grown on Hohn's egg medium to which a few drops of blood were added and they also grew under anaerobic conditions. Trichomonads accustomed to artificial cultivation would grow in serum broth and the presence of cells is therefore not essential for their development.

The morphology of the organism is carefully recorded and it is differentiated from *Trichomonas ruminantium* in that it is larger and that the chromatin bodies described as associated with the axostyle of the latter organism are not observed. The axostyle of *T. ruminantium* is entirely included in the body, whilst in the organism described the end protrudes from the body.

II. This article records infection of rabbits and guinea pigs with trichomonads either direct from uterine material or from pure cultures. Intravaginal infection in rabbits at the time of service appeared to lead to sterility, but some animals became pregnant and bore normal young. The buck rabbit did not transmit the disease. Pregnant guinea pigs commonly aborted after intraperitoneal inoculation and died after abortion ; abortion also occurred after intravaginal infection. Out of five animals infected *via* the vagina, two aborted, and three gave birth normally, but all showed trichomonads in the vaginal discharges. Subcutaneous, intramuscular and oral administration of trichomonads did not lead to abortion, but the first two methods led to trichomonad oedema, generalized trichomoniasis and death. The conclusion is drawn that it could be shown that trichomonads develop a distinct pathogenic action in small laboratory animals, particularly after intravaginal inoculation.

III. The author records the detection of trichomonads in five cases of bovine pyometra associated with sterility. The cases are recorded to stimulate research into trichomonad infection in view of the increasing importance of the problem of sterility.—U. F. Richardson.

Meleney, H. E., & Frye, W. W. (1933). **Studies of *Endamoeba histolytica* and other intestinal Protozoa in Tennessee : V. A Comparison of Five Strains of *E. histolytica* With Refeernce to Their Pathogenicity for Kittens.**—*Amer. J. Hyg.* **17.** 637-655. 3 figs. on 1 plate, 7 tables, 1 graph. [13 refs.]

The strains of entamoeba were from human sources and consisted of two from hill country where little natural pathogenicity was apparent, two from acute cases of disease in lowland country and one from a chronic case of disease in lowland country. The organisms were cultivated by Dobell's method and inoculated into the experimental kittens either into the ileum or the rectum. Inoculation

into the ileum proved more successful and young cultures (one to three days) gave a much higher percentage of infections than older cultures. The two acute lowland strains produced a higher percentage of infection in kittens than the chronic lowland strain or the two hill strains, and all the lowland strains caused the appearance of pathological lesions in infected kittens whilst the two hill strains caused only a few shallow lesions or no lesions at all.—U. F. Richardson.

Koffman, M. (1933). Ciliaterna i vämmen hos kor med skravelsjuka och mjökhälta och protozoernas eventuella betydelse för havände av dessa sjukdomar. [**Ciliates in the Rumen of the Cow affected with Mineral Deficiency and their Possible Inter-Connection**].—*Svensk Vet.-tidskr.* **38.** 144-158. 20 figs. on 7 plates, 4 charts.

The writer discusses a few of the theories concerning the pathogenicity or otherwise of the ciliates present in the rumen of the cow. He is of the opinion that most of those present are benign and help considerably in the digestion of cellulose, while others may build up proteins from amides and similar nitrogenous compounds. There are many varieties and a fall in the numbers of many of these is seen in sick cows. Throughout the observation it has been found that temperature and pH have been the determining factors for growth. Free-living protozoa die at a temperature between 38° and 40°C. while the optimum temperature for growth and multiplication of those found in the living cow was 39°C., which is the temperature of the rumen contents. The optimum pH was found to be between 5·5 and 8·0. Above or below this zone they quickly died.

The hay at the Stockholm Veterinary College raised the pH while soya meal, linseed, maize and crushed oats lowered it; ensilage acted as a buffer between the other foods. In sick cows, in which other medicinal measures had been of no avail, a quick improvement had been noticed after large numbers of protozoa taken from healthy cows were introduced into the rumen.

The author believes that there is some definite relationship between the numbers of protozoa present in the rumen and the general health of the cow, and that the bodies of the protozoa are an easily assimilable food. The observations were made on a few cows only and he is carrying them further on similar lines [see also this *Bull.* **4.** 62].—A. A. Forsyth.

I. Levaditi, C., & Schoen, R. (1933). Présence d'un toxoplasme dans l'encéphale de *Cynocephalus babuin*. [**The Existence of a Toxoplasm in the Brain of** *Cynocephalus babuin*].—*Bull. Soc. Path. exot.* **26.** 402-405. 2 figs. [5 refs.]

II. Krishnan, K. V., & Lal, J. C. (1933). **A Note on the Finding of** *Toxoplasma cuniculi* **in Two Experimental Rabbits.**—*Ind. J. Med. Res.* **20.** 1049-1050. 13 figs. on 1 plate. [2 refs.]

III. Nicolau, S. (1933). Nouvelles recherches expérimentales sur le *Toxoplasma caviae*. [**Further Experimental Research on** *Toxoplasma caviae*].—*C. R. Soc. Biol. Paris,* **113.** 706-708. [6 refs.]

I. This paper records the finding of a toxoplasm in the brain of a specimen of *Cynocephalus babuin* which was under experiment. Large cysts were encountered, measuring 60 μ to 80 μ in diameter, enclosed in a hyaline membrane and containing innumerable falciform bodies which were longer and had smaller nuclei than those of *Toxoplasma cuniculi*. An attempt was made to inoculate another monkey with *T. cuniculi*, but no cysts were detected although one of several rabbits subinoculated from it did develop a toxoplasm infection.

II. Records the detection of *T. cuniculi* in experimental rabbits in India.

Two rabbits which had received a course of injections of Indian ink and colloidal iron developed a fatal illness characterized by progressive loss of weight, diarrhoea and anaemia. Large numbers of toxoplasms were found in every smear and in the liver, spleen, bone marrow and heart blood. The authors think that a flare-up of latent toxoplasm infection may have resulted from the blockade of the reticulo-endothelial system.

III. Records the results of experimental work on the toxoplasm of the guinea pig. The spleen of infected animals was found to be infective although parasites could not be detected in spleen smears. The infectivity of spleen emulsion was removed by filtration, but not by centrifuging at 6,000 R.P.M. for 30 minutes. Rabbits could be infected by feeding them with infected material. Brains kept on ice for 140 days in the dry state were sometimes still infective. The infection of guinea pigs with *Klossiella caviae* appears to favour their infection with *T. caviae*.—U. F. Richardson.

Mélanidi, C., Tzortzaki, N., & Débonera, G. (1933). La spirochétose ictérohémorragique expérimentale du mouton, chevreau et porcelet. [**Experimental Spirochaetosis, *Spirochaeta icterohaemorrhagiae*, in the Sheep, Kid and Young Pig**].—*Rev. gén. Méd. vét.* **42.** 76-82. [4 refs.]

Domesticated animals [except dogs] being considered refractory to infection with *Leptospira icterohaemorrhagiae*, the authors made a series of transmission experiments with a strain of the organism isolated in guinea pigs by Petzetakis during an epidemic at Syra, an island in the Aegean Sea, in January, 1932. A preliminary note on the subject has already appeared [(1932). *C. R. Soc. Biol. Paris.* **110.** 482]. The inoculum consisted of a suspension in physiological saline of the liver and adrenal glands of a guinea pig dying after a typical infection on the sixth day.

Two lambs, aged eight and nine months, were inoculated in the testicle and peritoneum respectively. In both animals the inoculation was followed by dullness, lack of appetite and a temperature reaction. The presence of the organism in the blood was demonstrated by the subinoculation of guinea pigs. The lamb which was inoculated in the testicle developed a local inflammatory oedema which began to disperse when the temperature curve reached its peak on the fifth day. Marked injection of the conjunctival vessels was noticed in both animals.

Controlled experiments on guinea pigs demonstrated the presence of immune bodies in the sera of the lambs, 18 and 22 days after inoculation respectively.

A third lamb, aged nine months, was inoculated intracerebrally. It showed similar, milder symptoms, but subinoculations made four and five days after inoculation failed to infect guinea pigs.

An eight-month-old kid, inoculated intratesticularly, reacted in a similar manner to the lamb. General symptoms were mild. The presence of the organism in the blood was proved on the third day, and, after recovery, immune bodies were present in the serum.

Following upon the failure to infect a young pig mentioned in the preliminary note [see above] another attempt was made using a larger dose. The pig showed a local orchitis and a temperature reaction ; but there was no injection of the conjunctival vessels, and the presence of the organism in the blood could not be demonstrated.

[No mention of jaundice as a symptom occurs in the description of any of the positive cases].—J. R. Hudson.

Bouyoucos, B. (1933). La mobilisation des hématozoaires vers la circulation

périphérique sous l'influence de l'adrénaline. [**The Mobilization of Haematozoa in the Peripheral Circulation under the Influence of Adrenalin**].—*Bull. Soc. Path. exot.* **26.** 594-600. [12 refs.]

This article discusses the reputed value of adrenalin in provoking relapses of malaria with the recurrence of fever and the reappearance of parasites in the blood. Using adrenalin as a provocative agent in 146 subjects, the author concludes that it has no influence in causing a febrile relapse, but that, in treated patients and in recently infected cases, it may cause an increase of parasites in the peripheral circulation. The drug may, therefore, be of value in estimating the efficacy of treatment and in the diagnosis of fever cases admitted to hospital after the febrile paroxysm has subsided. It appeared to have little or no value as an aid to the detection of parasites in chronic cases.—U. F. Richardson.

Kamalow, N. (1933). Grahamella bei dem Wolfe. [*Grahamella* **in Wolves**].—*Zlb. Bakt. I.* (*Orig.*). **128.** 195-197. 6 figs.

A record of the finding of *Grahamella* in one wolf out of 15 which were examined after slaughter in zoological gardens. One infected corpuscle was found in every two to five fields examined. The animal was in the worst condition of those examined and autopsy showed evidence of anaemia of the internal organs. Helminth infestation was only slight and no ectoparasites were detected. The author suggests the name *Grahamella canis lupus* n. sp.—U. F. Richardson.

DISEASES CAUSED BY VIRUSES.

—. (1933). **Swine Fever and Paratyphoid in Pigs.**—*J. Comp. Path. & Therap.* **46.** 257-265. [1 ref.]

The article recalls the fact that Salmon and Smith (1885) showed that in fatal cases of hog cholera an organism, which they named *Bacillus cholerae suis*, could be cultivated from the blood and organs, and that swine could be infected by the injection of pure cultures of this organism or by feeding with cultures. Further, the *post-mortem* examination of pigs so infected revealed lesions similar to those found in animals that had contracted the disease naturally, and the bacillus could be recovered from the organs. As a result of these observations and experiments, which were confirmed with regard to the disease in Europe, it soon came to be generally assumed that the aetiology of hog cholera and swine fever had been definitely settled.

Soon afterwards, in the United States, attempts were made to deal with the disease by employing a vaccine, which was an artificial culture of the *B. cholerae suis*. The results, in the opinion of the Bureau of Animal Industry, indicated that none of these vaccines gave satisfactory results, but in many cases the immediate result of the vaccination was a fatal attack of what appeared to be, and was assumed to be, hog cholera. Pigs that became ill and died from the vaccination were not a source of danger to healthy animals kept with them, and this fact appeared to be very remarkable, since one of the most striking characteristics of hog cholera is its extraordinary capacity for spreading by contagion.

It was further found that the disease set up by the injection of hog cholera blood, in marked contrast to that produced by the cultures, had the same contagious character as the natural disease, and hogs that survived this inoculation were completely immune against the natural disease. It was these investigations which suggested that the cause of hog cholera might be some ultra-visible organism

present in the blood, and led to the discovery of the virus by DE SCHWEINITZ and DORSET in 1903.

The discovery of the virus as the true cause of the disease left unexplained the great frequency, amounting almost to constancy, with which the *B. cholerae suis*, subsequently named *B. suipestifer*, could be cultivated in a state of purity from the blood and organs in cases of swine fever.

On this subject opinion has been much divided, but in the opinion of the author it now appears to be approaching unanimity. In this connection the article discusses (1) the respective roles of the virus and of the bacillus in the causation of the symptoms and lesions, and (2) the biological or epidemiological characters of the bacillus.

Two views have been put forward regarding the aetiology of the lesions, namely, (a) that the virus is alone responsible, and (b) that the responsibility in cases of the natural disease is divided. The writer of the article agrees with those who think it probable that the *B. suipestifer* is mainly or entirely responsible for the visible structural alterations in the bowel, especially acute diphtheritic inflammation and the formation of definite ulcers in the caecum and colon. That seems to be indicated by the fact that such lesions, indistinguishable from those usually found in natural cases of the disease, are equally common in pigs infected with artificial cultures of the bacillus—that is, cases in which the virus has not played any part. On the other hand, the experiments by WALDMANN and others are quoted in favour of the view that in hyper-acute cases of the natural disease the fever and the vascular disturbances are probably the result of multiplication of the virus in the body and its great abundance in the blood.

With regard to the biological characters of the *B. suipestifer*, the article supports the opinion that, in all parts of the world where pigs are found, that organism is present in the environment, most probably as the result of faecal contamination. This view involves the further supposition that healthy pigs, in consequence of a natural resistance, are not affected by the presence of the bacilli in the intestine in ordinary circumstances, and also that infection of a healthy pig with the pure virus weakens this resistance, and thus enables the bacilli to multiply and invade the body. This conclusion is supported by the fact that in about 80 per cent. of pigs experimentally infected by the pure virus, the *B. suipestifer* appears in the pig's body in numbers that make the demonstration of its presence easy.

The assumption that paratyphoid bacilli, normally present in the bowel of pigs, may suddenly become highly virulent, invade the blood and organs, cause death, and serve as the starting point of an outbreak, is held to be now discredited. It is apparently diminished resistance on the part of the pig, and not increased virulence of the *B. suipestifer*, that accounts for the sudden invasion of the organism.

The cultivation of the *B. suipestifer* or any other member of the paratyphoid group from the carcase of a pig, and demonstration of the fact that the organism thus obtained is pathogenic for pigs, in the writer's opinion does not prove that the case in question was not one of swine fever. In that connection it is held that the only safe rule is not to diagnose paratyphoid in pigs until the non-existence of swine fever in the herd has been proved.

In conclusion the article discusses the alleged occurrence of an infectious enteritis of pigs distinct from swine fever, and indicates what appear to be defects in the evidence.

GLÄSSER. (1933). Zum Stande der Schweinepest in Deutschland. **[The Position of Swine Fever in Germany].**—*Deuts. tierärztl. Wschr.* **41.** 289-294. [3 refs.]

The number of swine fever outbreaks in Germany in 1932 was the lowest for 30 years, only 1,898 farms being infected. The author examines the possible reasons for this, and concludes that it is due in the first place to a better knowledge of the disease, the clearing up of its aetiology, the improvement in diagnosis and treatment, and especially the building up of veterinary police control since the war. In the second place he points to an increased resistance of the swine, following the continued instruction of pig owners in hygienic management and feeding, and lastly to the fall in the value of swine during the past three years and the consequent decline in the trade and in the movement of swine. Compensation in the case of outbreaks is not recommended, but financial help by public or other societies towards the cost of inoculation is desirable and, indeed, in widespread outbreaks is essential, if the disease is to be suppressed.—F. Bullock.

Bevan, Ll. E. W. (1933). **Further Note on Foot and Mouth Disease in Southern Rhodesia and an Emergency Method of Inoculation.**—*Trans. Roy. Soc. Trop. Med. & Hyg. London.* **27.** 105-108.

Bevan has already described a mild form of foot and mouth disease occurring in Southern Rhodesia [this *Bull.* **3.** 243.] and has indicated the measures successfully adopted to check its spread. In view of the low virulence of the infection, the spread of the disease was encouraged by inoculation or by direct contact in order to establish belts of immune cattle between infected and clean areas. Twenty months after the inception of the outbreak 185,388 cattle had been immunized, mainly by the intranasal injection of glycerinated, citrated infected blood, and the disease had been completely eliminated from the colony. The immunity seemed to be of considerable duration since 266 head of protected cattle were tested 14 months later and resisted infection.

As previously noted, under Rhodesian conditions infection was transmissible only by direct head to head contact. It is of interest that the Rhodesian strain, when transported to England, gave rise to severe reactions and was readily transmitted from animal to animal by parenteral routes.—R. E. Glover.

Lignières, J. (1933). Application à la " maladie des Chiens " de la méthode de vaccination contre la fièvre aphteuse. **[Application of the Method of Vaccination against Foot and Mouth Disease to Canine Distemper].**—*C. R. Soc. Biol. Paris.* **113.** 368-370.

The author describes his method of preparing hyperimmune serum which consists of an intramuscular injection of 1 g. of infective dog spleen suspended in normal saline. The spleen used in the experiment quoted was 37 days old and was obtained from an advanced case of the disease. Two dogs were used for this purpose and five and a half months later each received 180 c.c. of infective dog's blood intraperitoneally. One dog died about a fortnight later, but the other resisted infection and received, after an interval of 17 days, 160 c.c. of virulent dog's blood intraperitoneally and the same quantity subcutaneously. After a further period of nine days the dog was bled out and the serum collected.

For the purpose of vaccination four dogs were selected, including one control. The three dogs to be immunized received 0·5, 1 and 2 c.c. of serum intradermally and subcutaneously at the base of the ear and about 3-4 cm. away, and intradermal injections of 0·1 c.c. of infective dog spleen suspension. After the lapse of ten days these injections were repeated ; in this case, however, the virus is stated to have been more highly virulent. The two dogs receiving the smaller dose of serum developed temperatures and recovered and the third remained unaffected. A further lapse of ten days took place when all three dogs received 0·1 c.c. of an

emulsion of infective dog's spleen, but no serum. Two of the dogs (those which received the smaller dose of serum) became ill and both died. The third developed a temperature of 40°C. on the 4th, 5th and 6th days but recovered, and the control dog, as a result of contact with the others, developed a fatal distemper.

It is concluded that 2 c.c. is the minimum dose of serum allowable for this method of protection and that the rules which the author has formulated for the protection of animals against foot and mouth disease hold good for two other virus diseases, namely, swine fever and canine distemper.—G. W. Dunkin.

Shope, R. E. (1933). **Modification of the Pathogenicity of Pseudo-Rabies Virus by Animal Passage.**—*J. Exp. Med.* **57.** 925-931. 3 tables. [3 refs.]

The virus of " mad itch," which bears a close resemblance to the pseudorabies virus of Aujeszky, when passaged intracerebrally in the guinea pig fails to infect by the subcutaneous route except in massive doses. In order to determine the causes of this change, the effects of serial and single passage experiments were examined. The virus was transferred through the brains of 9 guinea pigs and 12 rabbits without affecting its pathogenicity. A single passage of virulent rabbit brain through guinea pig brain rendered the virus non-pathogenic for the latter species by the subcutaneous route, but a subsequent return to the rabbit restored its pathogenicity.

Titration experiments showed that there was approximately 10 times as much virus in rabbit brain as in an equal amount of guinea pig brain : in addition, the guinea pig was about 100 times more resistant to the virus than the rabbit. These factors, however, did not completely explain the resistance of the guinea pig to subcutaneous injection and it is inferred that guinea pig passage does exert some attenuating influence on the virus.—R. E. Glover.

I. Remlinger, P., & Bailly, J. (1933). Diffusibilité du virus de la maladie d'Aujeszky. [**Diffusibility of the Virus of Aujeszky's Disease**].—*C. R. Soc. Biol. Paris.* **113.** 844-846. [2 refs.]

II. Remlinger, P., & Bailly, J. (1933). L'inoculation du virus de la maladie d'Aujeszky dans la chambre antérieure de l'oeil. [**Inoculation of the Virus of Aujeszky's Disease into the Anterior Chamber of the Eye**].—*Ibid.* 1020-1023.

III. Remlinger, P., & Bailly, J. (1933). Sur la résistance du virus de la maladie d'Aujeszky à la dessiccation. [**The Resistance to Desiccation of the Virus of Aujeszky's Disease**].—*Ibid.* 1109-1110. [1 ref.]

I. When the brain of a cat or rabbit that has died of Aujeszky's disease is immersed in glycerine or Locke's solution, the contained virus diffuses into the surrounding liquid. The virus is capable also of diffusing into a healthy brain or piece of liver suspended in the same jar as the affected brain but not in contact with it.

II. Inoculation into the anterior chamber of the eye appears to be the most sensitive route of infection and the rabbit the best experimental animal. The infection set up by this route is not always acute, but the characteristic pruritus is rarely absent.

III. The virus of Aujeszky's disease is extremely resistant to desiccation and there was no appreciable loss of virulence at the end of two months under conditions which killed rabies virus (fixed virus) in six days and street virus in seven days. —T. M. Doyle.

I. Remlinger, P., & Bailly, J. (1933). Transmission aux Oiseaux de la

paralysie bulbaire infectieuse (maladie d'Aujeszky). [**Transmission of Aujeszky's Disease to Birds**].—*C. R. Soc. Biol. Paris.* **112.** 1043-1045. [2 refs.]

II. Remlinger, P., & Bailly, J. (1933). Sur quelques modes d'inoculation du virus de la maladie d'Aujeszky. [**Methods of Transmission of the Virus of Aujeszky's Disease.**—*Ibid.* 1147-1150. [1 ref.]

III. Remlinger, P., & Bailly, J. (1933). La maladie d'Aujeszky expérimentale du Chat. [**Experimental Aujeszky's Disease in the Cat**].—*Ibid.* 1274-1276.

IV. Remlinger, P., & Bailly, J. (1933). La maladie d'Aujeszky expérimentale du Lapin. [**Experimental Aujeszky's Disease in the Rabbit**].—*Ibid.* 1606-1608.

V. Remlinger, P., & Bailly, J. (1933). Le sang dans la maladie d'Aujeszky. [**The Blood in Aujeszky's Disease**].—*Ibid.* **113.** 362-364.

VI. Remlinger, P., & Bailly, J. (1933). Transmission de la paralysie bulbaire infectieuse (maladie d'Aujeszky) au Hérisson. [**Transmission of Aujeszky's Disease to the Hedgehog**].—*Ibid.* 557-559.

VII. Remlinger, P., & Bailly, J. (1933). Action de la dilution, de la chaleur et de l'éther sulfurique sur le virus de la maladie d'Aujeszky. [**The Effect of Dilution, of Heat and of Ether on the Virus of Aujeszky's Disease.**—*Ibid.* 689-691. 1 table.

I. Although it is considered that birds are solidly resistant to the virus of Aujeszky's disease, the authors have succeeded in transmitting an American virus to the fowl, pigeon, goose and buzzard, while the duck was susceptible to both strains. The symptoms of the experimental disease are described.

II. In addition to the usual methods of inoculation (intracerebral, intraocular, intramuscular and subcutaneous) the virus of Aujeszky's disease (Hungarian and American strains) was transmitted by other routes. The virus readily traversed the nasal mucous membrane of the rabbit or guinea pig while conjunctival instillation succeeded in one case out of five. The dog and guinea pig were infected by intraplantar injection and the rat by the route of the skin of the tail. In the rabbit intratesticular inoculation induced all forms of the disease. Ingestion of affected tissues succeeded in the cat, dog, the pig and the rabbit.

III. A description of the clinical symptoms produced in the cat by intracerebral or intramuscular injection of the American, Hungarian and Austrian strains.

IV. The various manifestations of the disease in the rabbit are described. The incubation period was usually 40 to 50 hours, but after passage through this species it was reduced to 15 to 20 hours.

V. In the rabbit, the virus was demonstrated in the blood stream after the 15th hour : moreover, the blood was infective while the brain was still negative. The blood was occasionally positive in the cat and the fowl, but the virus was not recovered from the dog, rabbit and hedgehog even in the terminal stages of the disease. Experiments on the location of the virus suggested that it was adsorbed to the red cells : the leucocytes and plasma (or serum) were non-virulent.

VI. Four experiments with the hedgehog (*Erinaceus* L.) suggested that this species was very susceptible to the virus. Infection was set up by the alimentary tract (three times) and by subcutaneous inoculation.

VII. The virus of Aujeszky's disease as obtained from the brain behaved to various external influences in a similar manner to that of rabies. Thus a 1 : 500,000 dilution was still virulent in a dose of 1·0 c.c., but 0·5 c.c. was non-infective. It was destroyed in 30 minutes at 60°C. and was slowly inactivated by immersion in

ether, a period of 145 hours being required to render it inert (rabic brain under similar conditions was inactivated in 120 to 125 hours).—R. E. Glover.

Havens, L. C., & Mayfield, Catherine R. (1933). **Antigenic Properties of Rabies Virus. III. Composition of Serologic Variants and Nature of Fixed Virus.**—*J. Infect. Dis.* **52.** 364-373. 8 tables. [7 refs.]

These experiments were undertaken with the object of presenting additional evidence that quantitative differences can be demonstrated in various strains of rabies virus. The results obtained by agglutinin absorption tests on six different sera indicated that the fixed virus and one other strain failed to reduce the agglutinin content of any serum while other strains removed varying amounts of agglutinin. This suggests that different viruses, although possessing common components, differed in the relative proportions of each. Repeated absorption by four of these strains resulted in complete exhaustion of two sera while the remaining two were unaffected.

The results of protection tests (intracranial inoculation of rabbits) showed that neutralization of heterologous strains can be obtained, provided that large amounts of serum are employed.

It is suggested that these differences may offer an explanation of the reported failures of the single injection method of vaccinating dogs.—R. E. Glover.

Nicolau, S., Mathis, C., & Constantinesco, Val. (1933). La rage autochtone (maladie du chien fou) en Afrique Occidentale Française. (Étude critique et expérimentale). [**Rabies Indigenous to French West Africa**].—*Ann. Inst. Pasteur.* **50.** 778-839. 26 text figs., 16 figs. on 1 plate. [42 refs.]

The authors have already given a description of their investigations into " oulou-fato " or mad dog disease [this *Bull.* **2.** 332]. In this article their experimental findings are reported in greater detail. The original virus was transmitted serially in rabbits and two fixed strains obtained, which killed in 8 to 10 and 10 to 12 days respectively. Considerable difficulty was experienced owing to the occurrence of autosterilization after a few passages. Definite Negri bodies were found, but they progressively diminished in size and number although they never entirely disappeared.

The virus was highly pathogenic for the monkey, rabbit and guinea pig and less so for the dog, fowl, mouse and rat. The street virus killed the rabbit intracerebrally in a 1 : 500 dilution and the fixed virus in a 1 : 20,000 dilution. The street virus was rapidly attenuated by glycerine ; the fixed virus in similar circumstances was still virulent after three to four months. A rabbit solidly immunized against a classical strain of rabies was resistant to intracerebral inoculation of the indigenous virus.

In answer to criticisms of Remlinger, the authors reiterate their contention that the innocuity of the virus for human beings does not necessarily indicate that it is distinct from rabies. They suggest that it is an attenuated form of rabies and that the rare occasions on which human beings are infected are attributable to some special sensitiveness on the part of certain subjects.—R. E. Glover.

Bock, H. (1933). Ein Fall von wahrscheinlicher Impflähmung nachTollwutschutzbehandlung und kritische Bemerkungen zur Frage der Impfschädigungen. [**A Case of Apparent Vaccination Paralysis, Anti-Rabies Inoculation and Criticism on Vaccination Injuries**].—*Zlb. Bakt. I.* (*Orig.*). **129.** 43-50. 3 tables. [17 refs.]

Post-vaccination paralysis usually follows the use of living virus, but may

occur after the use of killed virus. It is suggested that the complications follow the action of a specific endotoxin derived from living or dead virus or, alternatively, are caused by some component of the central nervous system of the rabbit, unavoidably incorporated in the vaccine.—E. J. PULLINGER.

PERDRAU, J. R., & TODD, C. (1933). **Canine Distemper. The High Antigenic Value of the Virus after Photodynamic Inactivation by Methylene Blue.**—*J. Comp. Path. & Therap.* **46.** 78-89. 8 tables. [8 refs.]

It is shown that, by exposing a mixture consisting of equal parts of a solution of methylene blue (1 : 50,000) and of the supernatant fluid from a 2 per cent. centrifuged saline suspension of infected ferret spleen, to a pointolite lamp for varying periods of time, the virus was not only inactivated, but the resultant suspension provided a vaccine of considerable value. Ten minutes was the shortest time during which it was found possible to inactivate the virus of canine distemper and when exposed for five minutes it was found that the virus was still alive and virulent.

In one experiment, designed to confirm previous ones, an interesting and unexpected result followed. A number of ferrets which were injected in duplicate with mixtures of dye and virus, inactivated for periods of 10, 15, 20 and 30 minutes, all developed and succumbed to the unmodified disease within 12 days. Investigations showed that the spleen used as a source of virus was only one day old and when the experiment was repeated with 17-day-old spleen all the vaccinated ferrets proved to be immune whereas the controls died of uncomplicated distemper. The explanation offered by the authors is that, in the case of the one-day-old spleen, some of the tissue cells were still alive and were therefore capable of protecting the virus against the photodynamic action of the methylene blue. The authors proceed to argue that, if this explanation is correct, it should be possible to abolish the protective action of supposed living cells by filtration of the supernatant fluid through one of the " gradacol " membranes made by ELFORD.

An experiment designed to support this contention proved it to be correct.

Experiments were also carried out with a view to ascertaining the effect of prolonged exposure to the pointolite lamp and over-irradiation with sunlight, as well as the keeping qualities of the inactivated virus.

It was found that a satisfactory vaccine dried immediately in the dark and kept in the cold preserved its antigenic value for at least two months. Owing to limited supplies, only one experiment was carried out on dogs, but in this case both the dogs used (one received 20 c.c. and the other 2 c.c. of vaccine) were subsequently proved to be immune.

An advantage of this method of vaccination over that advocated by LAIDLAW and DUNKIN is that, whereas the effective dose of formolized vaccine contains at least 10,000 minimal infective doses of virus, it represents 100 times that of an effective dose of methylene blue vaccine. Furthermore, in the latter the greater part of the splenic tissue is removed, thereby eliminating the local swelling and persistent induration which may occasionally be observed at the site of inoculation in animals receiving formolized vaccine.

The work opens up yet another new line in the field of work on virus diseases as well as providing an alternative method of vaccination against canine distemper.
—G. W. DUNKIN.

CHRISTL, H. (1932). Beobachtungen über den Verlauf, die Ausbreitung, die Formen und die Therapie der infektiösen Anämie der Pferde. [**The Course,**

Distribution, Forms and Therapy of Equine Infectious Anaemia].—*Münch. tierärztl. Wschr.* **83.** 409-411.

The author gives it as his opinion that equine infectious anaemia is more common than is generally supposed. In his own district it occurs on the low-lying marshy ground and is quite unknown in the higher country.

In the acute form of the disease, there is no recognizable anaemia and death takes place, as though from a septicaemia, in about a week. At *post-mortem* examination degenerative myocarditis, parenchymatous hepatitis, and nephritis, enlargement of the spleen and petechial haemorrhages of the serous membranes are found.

Even in the subacute chronic form of the disease there may be no anaemia. There is general evidence of malaise and jaundice is prominent in severe cases. Diagnosis in chronic cases presents difficulties. Intermittent fever is a prominent symptom, but sometimes the intervals between exacerbations may be very long, amounting even to weeks. The disease makes its appearance with the beginning of the warm weather and steadily increases up to the autumn. There seems to be little or no evidence of the direct transmission of the disease from animal to animal, and the author suspects that the infective material is conveyed by water. The period of incubation ranges from two to four weeks.

Complete rest and symptomatic treatment appear to be of value, but the rest is the most important.

The author appears to have tried a large number of patent drugs.

—A. Leslie Sheather.

I. Plotz, H. (1933). Culture rapide du virus de la peste aviaire. [**Rapid Cultivation of Fowl Plague Virus**].—*C. R. Soc. Biol. Paris.* **113.** 570. [2 refs.]

II. Plotz, H., & Ephrussi, B. (1933). La culture de la peste aviaire en présence de cellules vivantes non proliférantes. [**Cultivation of Fowl Plague Virus in the Presence of Viable Non-Proliferating Cells**].—*Ibid.* 711-712. [2 refs.]

I. The virus of fowl plague cultivated in minced chick embryo suspended in Drew's medium [see this *Bull.* **3.** 248.] increases appreciably after 24 hours at 37°C. In these experiments repeated subcultures were made every 24 hours for 28 consecutive days. The final passage, representing a dilution of 6^{28} of the initial culture, killed a hen in a dose of 1/500,000 c.c.

II. The virus was also maintained in serial culture in medium which had been incubated for 5 days at 37°C. prior to inoculation. Since sections of the fragments of tissue no longer showed mitotic figures and the addition of the virus also failed to stimulate cellular proliferation, it is concluded that the virus can be grown in the presence of living cells which are not multiplying.—R. E. Glover.

I. Plotz, H. (1933). Influence de la quantité des cellules embryonnaires sur la culture du virus de la peste aviaire. [**Influence of the Number of Embryonic Cells on the Cultivation of Fowl Plague Virus**].—*C. R. Soc. Biol. Paris.* **113.** 1336-1337. [6 refs.]

II. Plotz, H. (1933). Culture du virus de la peste aviaire en présence de cellules embryonnaires de Canard. [**Cultivation of the Virus of Fowl Plague in a Medium containing the Embryonic Tissue of Ducklings**].—*Ibid.* 1495-1496. [2 refs.]

I. Plotz found that, in the cultivation of fowl plague virus, the number of embryonic cells, suspended in Drew's liquid, exercised no appreciable influence on the quantity of virus obtained ; and that the virulence of the virus diminished

more quickly in the presence of a large number of cells than when a small number only was present in the medium.

II. The virus was successfully cultivated in a medium containing the embryonic cells of young ducks instead of chick cells.—T. M. Doyle.

Johnstone, R. N. (1933). **Pseudo Poultry Plague. The Second Outbreak.**—*J. Dept. Agric. Victoria.* **31.** 80-83. 4 figs.

The first outbreak of pseudo poultry plague or Newcastle disease in Victoria occurred during the summer of 1930 to 1931. The disease was stamped out and quarantine regulations were then removed. Eighteen months later this second outbreak occurred and, although symptoms differed in some details from those seen previously, it was demonstrated by cross-immunity tests to be a recurrence of the same disease. In 1930 to 1931, affected birds almost invariably showed a thick mucous discharge from the nostrils and mouth, but during the second outbreak this was exceptional. The most constant symptoms are those of general indisposition, respiratory distress, diarrhoea and paralysis of the limbs. Quarantine regulations are outlined.—W. I. B. Beveridge.

Lourens, L. F. D. E. (1933). Inenting tegen de diptherie en pokken bij kippen met de entstof der Rijksseruminrichting. [**Vaccination against Fowl Pox with Vaccine from the State Serum Institute**].—*Tijdschr. Diergeneesk.* **60.** 302-304.

A review is given of the results obtained with fowl-pox vaccine from the State Serum Institute at Rotterdam. The results were favourable : a good local reaction took place, but no general reaction ; in young birds which were good layers, moulting occurred, however, and egg production decreased. Sulfoliquid is recommended as a disinfectant. This can also be added to drinking water (2 per cent.). Immunity from the spontaneous disease lasts on an average eight months ; the immunity after vaccination depends upon the local reaction and also upon virulence and method of application.—A. Klarenbeek (Utrecht).

Stevenson, W. D. H., & Butler, G. G. (1933). **Dermal Strain of Vaccinia Virus Grown on the Chorio-Allantoic Membrane of Chick Embryos. A Possible Large Scale Production of a Bacteria-Free Virus.**—*Lancet.* **225.** 228-230. [5 refs.]

The authors describe the inoculation of the chorio-allantoic membrane of chicks with a dermal strain of vaccinia virus, according to the technique introduced by Woodruff, Goodpasture, & Buddingh [this *Bull.* **3.** 81].

A detailed description is given of the technique for the inoculation of the virus into the developing egg. An experiment was carried out to ascertain the possibility of a large-scale production of virus by this method. The virus obtained from a first passage on the chick membrane was inoculated into two groups of eggs, each consisting of 19, at the tenth day of incubation. The virus material obtained from these eggs after four days of incubation weighed 18·3 g. and 17·8 g. respectively.

Potency tests on rabbits showed the chick membrane virus to be equal to good strong calf vaccine lymph.—T. M. Doyle.

Cowdry, E. V. (1933). **The Microincineration of Intranuclear Inclusions in Yellow Fever.**—*Amer. J. Path.* **9.** 149-164. 14 figs. on 2 plates. [24 refs.]

Preparations of uninjured liver cells of monkeys were made by methods of microincineration [see Danks, W. B. C. (1932). *Amer. J. Path.* **8.** 711-716, for

description of technique in detail] and compared with those of liver cells from a case which had reacted to the virus of yellow fever. In the former, the nuclear ash corresponds closely in position with the materials seen in fresh cells, as well as in fixed and stained preparations. The nucleolus is found to be amphophilic in fixed and stained preparations and yields a very heavy, sharply-localized ash after incineration ; chromatin leaves a rather less dense mineral residue. Marked alterations are seen in the nuclei of cells from a case of yellow fever in which nuclear inclusions are developing. The changes in size and shape of the nuclei, in the basophil chromatin and nucleolus can be followed with equal precision in incinerated specimens because of parallel modifications, but the nuclear inclusion, pathognomic of the disease, although a conspicuous feature of fresh, fixed and stained preparations, cannot be studied in incinerated specimens as they yield little or no ash.—J. R. M. Innes.

Gibbs, C. S. (1933). **Filtrable Virus Carriers.**—*J. Infect. Dis.* **53.** 169-174. 3 tables. [8 refs.]

The author carried out experiments in China to ascertain whether the viruses of swine fever (" hog cholera ") and rinderpest could be detected in the systems of recovered pigs and cattle respectively. Typical button ulcers were obtained from the intestines of six stunted pigs that had been affected with swine fever 42, 56, 72, 80 and 94 days respectively.

The excised tissues were ground up separately and a sample of each was inoculated subcutaneously into two pigs each aged four weeks. The inoculated pigs were placed in six pens in an isolated part of a stockyard that had never previously been used for pigs. All the animals except the pair inoculated with the 80-day material contracted swine fever.

In the case of rinderpest, ulcers were obtained from the pyloric portion of the abomasum of seven animals that were alleged to have been affected with the disease several months previously. Each ulcer was ground up, suspended in normal saline and inoculated [? route] into two six-week-old calves. Four of the seven pairs of calves developed rinderpest.

[The carrier problem in swine fever and in rinderpest is of considerable economic and scientific importance and it is advisable, therefore, to scrutinize closely any experimental work that claims to have proved the existence of such animals. The fact that in the work here recorded, which was carried out as carefully as possible under the existing conditions, the history of the animals from which the virus was obtained was practically unknown and that the experimental animals were housed in a stockyard, reduces the value of these experiments. Furthermore, no mention is made as to the origin of the experimental animals—a point of cardinal importance. To carry out experiments of this nature in a country where there is a high incidence of both swine fever and rinderpest would require elaborate equipment and would necessitate the breeding of the experimental animals under rigorous laboratory conditions].

Gibbs, on his return to America, confirmed the existence of carriers among fowls recovered from laryngotracheitis. Twenty-two carriers were detected out of 1,000 fowls examined ; the longest period a bird was found to harbour the virus was for 741 days.—T. M. Doyle.

Renaux, E. (1933). Diversité des principes autolytiques. **[Heterogeneity of Bacteriophages].**—*Ann. Inst. Pasteur.* **50.** 604-607. [5 refs.]

In this article Renaux controverts Gratia's criticism of his work with Bordet on lytic principles [this *Bull.* **3.** 553]. In their experiments on anti-coli bacterio-

phage they discovered two lytic principles, one of which was capable of lysing a *Bact. coli* culture in all its phases, whereas the other attacked the S type only and respected the R type. They called the former a " strong " and the latter a " weak " principle.

Gratia [(1933). *Ann. Inst. Past.* **50.** 306.] contests this classification on the grounds that the so-called weak bacteriophage acts energetically on S colonies. He asserts that the principle of heterogeneity has been incorrectly interpreted, particularly by Bordet and Renaux. The latter replies that a principle which attacks one variant only is less active than one which lyses two and is, therefore, rightly termed a " weak " agent.—R. E. Glover.

Beard, P. J. (1933). **Rôle of Bacteriophage in Natural Purification.**—*J. Infect. Dis.* **52.** 420-426. 1 fig., 3 tables. [21 refs.]

Details are given of experiments devised to determine whether bacteriophage plays any part in stream or sewage purification. From his results the author concludes that it is unlikely, as, apart from the fact that environmental conditions are not usually conducive to bacteriophagy, a greater or less amount of the lytic substances is adsorbed by the polluting material and so removed from effective action. It also appears improbable that the presence of the bacteriophage will interfere or cause misinterpretation of the routine tests employed in water and sewage examinations.—Gwilym O. Davies.

INVERTEBRATE VECTORS OF DISEASE.

Lewis, E. A. (1931 and 1932). **A Study of the Ticks in Kenya Colony. The influence of natural conditions and other factors on their distribution and the incidence of tick-borne diseases. Part I. A report on an investigation into the tick problem in the Rift Valley, Kenya Colony. Part II. A report on the investigation into the tick problem in the Rift Valley (contd.), the Uasin Gishu and the Trans-Nzoia Districts, Kenya Colony.**—*Dept. Agric., Kenya. Bull.* No. 17, 1931, and No. 6, 1932. pp. 20 and 33. 1 fig., 5 tables, 1 map.

I. Lewis undertook the present investigation in the Rift Valley, Kenya.

Twenty-three species of ticks belonging to six genera were found during the investigation, and buffalo, zebra and bush-buck were found to act as important wild hosts, their gregarious habits enhancing their importance in infesting land with vectors of tick-borne diseases.

It was found that *Rhipicephalus bursa*, *R. evertsi*, *Boophilus decoloratus* and *Haemaphysalis leachi* were generally distributed. *Hyalomma* sp. occurred commonly and abundantly in districts where the soil was porous and light. *Amblyomma variegatum* was not as common as previously, and appeared to have been controlled by dipping. It occurred mainly in the lower districts and on the light volcanic areas of the Rift. It was, however, sometimes found at an altitude of 7,000 feet. *Rhipicephalus* sp. occurred on all soils. *Ixodes* sp. were collected mainly from the slopes of the lower hills and were not known to transmit any disease in the district. The distribution of *B. decoloratus* was affected to some extent by dipping. In some districts there was an antipathy to dipping against *B. decoloratus*, the vector of redwater and anaplasmosis, as the cattle might become susceptible to these conditions. Redwater, anaplasmosis, biliary fever of dogs and East Coast fever were more or less common and heartwater of cattle, sheep and goats and biliary fever of horses occurred in certain districts.

A " tick paralysis " occasioned losses among lambs and caused minor symptoms in sheep ; the tick suspected was *Hyalomma aegyptium*.

II. In continuation of his investigation into the influence of natural conditions and other factors on the distribution of ticks and the incidence of tick-borne diseases, Lewis gives at greater length an account of the climate, fauna and vegetation of the district.

It has been shown that outbreaks of East Coast fever in clean areas originate from comparatively small areas known as " infected pockets " where the ticks find the optimum conditions for survival.

The movement of sheep from " dirty " to " clean " areas is shown to be dangerous unless the sheep are carefully dipped and rendered tick-free.

In addition to dipping, the importance of hand-dressing is emphasized.

—J. S. Steward.

Schroeder, H. O., Jr. (1933). **A Note on the Occurrence of the Australian Cattle Tick in Texas.**—*Proc. Entomol. Soc. Washington.* **35.** 23-24. [1 ref.]

The Australian cattle tick, *Boophilus annulatus* var. *Australis* Fuller, has been recorded in Texas for the first time in the United States of America. It is widely distributed, however, in South America and occurs as far north as Mexico. It is considered probable that this tick was introduced into Southern Texas on cattle from Mexico. This variety is distinguished from the American cattle tick, *B. annulatus* Say, by the presence of a protuberance on the posterior margin of males which is absent in the American variety.—J. S. Steward.

I. Jack, R. W. (1932). **Tsetse Fly Operations in Lomagundi District (Umboe and Sipolilo Areas).**—*Rhodesia Agric. J.* **29.** 886-905. 2 maps.

II. Jack, R. W. (1933). **The Tsetse Fly Problem in Southern Rhodesia.**—*Ibid.* **30.** 365-384. 1 map.

I. The writer gives an account of the measures taken against *Glossina morsitans* in certain districts of Southern Rhodesia. The aim of these operations was to put a sufficient distance between the occupied country and the definite fly area, so as to place the farms beyond the reach of ranging flies.

The measures adopted were the slaughtering of game and the erection of fences. The latter were of seven strands of barbed wire, gauge 12½, and 6 feet high. The top wire was 18 inches above the next and three wires were then concentrated 7½ inches apart, for at that height they take the weight of the average big buck running into the fence. Breakages by big game were at first frequent, but soon diminished considerably. The fences were regularly patrolled and the breakages repaired daily. For the destruction of game a small number of paid native hunters were employed and rifles were supplied to 30 unpaid native hunters.

The results obtained allowed the reoccupation of many farms that had been abandoned and the losses from trypanosomiasis in cattle were considerably reduced. The presence of considerable numbers of baboons in the fenced areas did not prevent the disappearance of the fly.

II. In this article the writer has set out to make the nature of the tsetse fly problems in Southern Rhodesia clear to, at least, the inhabitants. An account is given of *G. morsitans* and its distribution in the colony, both at the present time and in the past. The control of fly by game fences and game reduction measures is explained and alternative measures are discussed. The primary objects of tsetse control in Southern Rhodesia have been to save the immediately threatened areas, to stem the advance of the fly generally and to drive back the fly a sufficient distance, where its advance has involved country in which its continued presence

or frequent incursions are of particular importance.

The additional value in certain areas of traffic control regulations and measures to rid vehicles and men of tsetse flies is also mentioned.—J. S. Steward.

Lloyd, Ll. (1933). **Factors Influencing Trypanosome Infection Rate in Tsetse Flies.**—*Trans. Roy. Soc. Trop. Med. & Hyg. London.* **26.** 555-556.

In this letter in reply to Duke [see this *Bull.* **4.** 36.], Lloyd points out that his view that " The factors which influence the rate of infection in tsetse by trypanosomes are so many that it is impossible to estimate with any degree of accuracy the transmissibility of any particular strain," was formed not only as the result of the incubation of tsetse, but also on other factors which he or others had thought might influence the infection rate. He also points out that the incubation temperatures employed in his experiments were not far from those obtained for two months of the hot season.—U. F. Richardson.

Yorke, Warrington, Murgatroyd, F., & Hawking, F. (1933). **The Relation of Polymorphic Trypanosomes, Developing in the Gut of Glossina, to the Peritrophic Membrane.**—*Ann. Trop. Med. & Parasitol.* **27.** 347-354. 5 figs. on 2 plates. [6 refs.]

The object of this paper is to record observations made by the writers, during the course of experiments on the transmission of a tryparsamide-resistant strain of *T. brucei* through *G. morsitans* and *G. palpalis*, regarding the position of the developing trypanosomes in relation to the peritrophic membrane of the midgut and proventriculus. After the first few days of the infection, trypanosomes were found to be limited to the space outside the peritrophic membrane, between the membrane and the gut wall. As the infection developed, the trypanosomes gradually extended forward along this extra-peritrophic space as far as the proventriculus where they passed through the fluid secretion of the annular pad (from which the membrane is formed) and so reached the lumen of the proventriculus and oesophagus. These observations confirm those published by Taylor [this *Bull.* **3.** 532].—Ll. E. W. Bevan.

DISEASES CAUSED BY METAZOAN PARASITES.

Patton, W. S. (1933). **Studies on the Higher Diptera of Medical and Veterinary Importance. A Revision of the Genera of the Tribe Muscini, Subfamily Muscinae, Based on a Comparative Study of the Male Terminalia. I. The Genus *Musca* Linnaeus.**—*Ann. Trop. Med. & Parasitol.* **27.** 135-156. 11 figs. [6 refs.]

Patton redefines the generic characters of *Musca* and points out that the blood-drawing apparatus in *Musca* is essentially of a scratching and tearing nature, the ends of the interdental armature and teeth only entering the skin ; it is therefore strictly not a piercing apparatus. The importance is emphasized of a thorough study of both the male terminalia and the proboscis in studying the relationship of the species.—J. S. Steward.

—. (1933). **A Fly Resistant Ram.**—*Pastoral Rev.* **43.** 51.

Tests to demonstrate immunity to fly-strike of a pure-bred Merino ram being carried out at the Animal Health Station, Yeerongpilly, Brisbane. The ram was bred at Cunnamulla, Queensland, and is described by the breeder to be the last of the first generation of fly-proof rams bred on the property. It is stated that the ram had resisted all the operations of the blowfly in the two months since it

was sent to Yeerongpilly, and that the most careful and exhaustive tests were being conducted. A ewe in the same pen as the ram was struck by the fly, but the ram remained untouched. It is understood that larvae placed on the wool drop off. —H. McL. Gordon.

Mitchell, W. C., & Cobbett, N. G. (1933). **Field Investigations Relative to Control of Oestrus Ovis.**—*J. Amer. Vet. Med. Ass.* **83.** 247-254. 2 figs., 1 table. [2 refs.]

The object of this research was to secure information as a basis for developing control measures against *Oestrus ovis*, the larvae of which are very common in the cavities of the heads of sheep in Texas and New Mexico. The infestation in individual cases varied from one to 40 larvae in all stages of development. The first-stage larva appeared to migrate from the nasal passages to the frontal sinuses. The maxillary sinuses were seldom infested. No evidence was collected that the larvae cause the death of sheep in large numbers, but they are a factor in the production of excessive nasal discharge.

Pathological changes in the tissues were only observed when the larvae had died within the cavities. This raises the question as to the value of treatments aiming at killing the parasite *in situ*. Preventive measures deserve prior consideration. The authors' observations as to how sheep try to prevent the adult fly getting to the nostrils are in agreement with those of earlier workers. Feeding and proper management are thereby considerably upset.

A thorough hand application of commercial pine tar to the noses of the sheep at intervals of from twice a week to once in two weeks had very little repellent effect on the adult fly in a series of controlled experiments.

A salt trough tar applicator, which spills the tar when used, is figured and described. After the sheep had had access to this for 21 days it was found that 31·8 per cent. had received a good application, 33·5 per cent. a fair one, and 34·7 per cent. showed little or no evidence of smearing.—A. W. N. Pillers.

I. China, W. E. (1933). **A new Genus and Species of *Anthocoridae* (Hemiptera) from New Zealand.**—*Ann. & Mag. Nat. Hist.* **11.** 514-518. 4 text figs.

II. —. (1933). **Cattle Blood-Sucking Habit of a Bug.**—*Nature.* **131.** 806-807.

I. Reference is made to *Lyctocoris campestris*, which is commonly found in stables and cattle sheds and it is recorded by Reuter as sucking the blood of horses and cattle. It is suggested that it may possibly transmit foot and mouth disease. [This suggestion appears highly speculative].

II. This is a reference to the previous article.—J. S. Steward.

—. (1932). **Helminthological Society of Washington. Proceedings of the One Hundred Forty-fourth to One Hundred Forty-eighth Meetings.**—*J. Parasitol.* **19.** 83-94.

The following points are selected from these proceedings as being of veterinary interest.

Alicata reported the finding of *Moniezia benedeni* in a peccary, and in connection with it gives a list of the previous reports of the occurrence of cestodes in wild and domestic pigs. *Stephanurus morai* de Almeida, 1928, is pointed out to be a synonym of *S. dentatus*, de Almeida having created his new species as a result of an erroneous statement made on the morphology of *S. dentatus*.

Rees reported an additional confirmatory finding on the ability of *Dermacentor variabilis* to transmit anaplasmosis. Larvae engorged on clinical cases transmitted anaplasmosis as nymphs and engorged nymphs transmitted the disease as adults.

A second note was presented on the demonstration of *D. andersoni* as another vector of the disease, and a third note on the demonstration of *Rhipicephalus sanguineus* as a third vector. In no instances was the hereditary transmission shown and it is probable that one-host ticks are incapable of transmitting the disease.

Hadwen reported on an investigation on the effect of applications of saturated salt solution to the backs of cattle for the control of warbles. It was found that young grubs were killed and it is considered that the method deserves further investigation.

Law presented a note on the value of brine for the destruction of hookworm larvae. The brine was applied to fox pens in the form of a spray and controlled the infestation very effectively.

Price reported the finding of *Alaria arisaemoides* in the duodenum of a dog, apparently the first record in a domestic carnivore.

Underwood and Wright reported on the use of fouadin (sodium-antimony III bis-pyrocatechin-disulphonate of soda) in the treatment for *Dirofilaria immitis* in the dog. The dose used in man was found to produce marked local and systemic reactions but the microfilariae disappeared from the circulation.

Dikmans reported the finding of *Cysticercus ovis* in the oesophagus of 4 sheep and presented a note on *Cooperia nicolli* which he considers to be a synonym of *C. pectenata*.

Wehr presented a note on the differentiation of the infective larvae of *Strongylus equinus*, *S. edentatus* and *S. vulgaris* confirming Wetzel's results.

Cram reported the experimental infection of the oesophagus of the turkey with *Capillaria contorta* and the finding of *Capillaria retusa* in the turkey.

—E. L. Taylor.

Galli-Valerio, B. (1933). Notes parasitologiques et de technique parasitologique. [**Parasitological Notes**].—*Zlb. Bakt. I.* (*Orig.*). **129.** 422-433. 1 fig. [16 refs.] [Orig. in French].

The first portion of this paper deals with various parasites found in 55 species of fish, birds and mammals. Several records relate to human beings and the domesticated birds and animals in the cantons of Valais and Vaud, Switzerland. *Hypoderma bovis* is reported from the forehead of a young girl and *Dibothriocephalus latus* from a fatal case of anaemia in a woman. There is a short account of the possibility of introducing parasitic diseases when restocking with different species of game birds and an instance is given of the value of faecal examination in this direction. A paragraph is devoted to the subject of the scattering in the faeces by carnivora of eggs of worms from hosts upon which they prey ; an example is the dispersion of eggs of rodent tapeworms by foxes. The author found 4 dung beetles, *Aphodius obscurus*, in the excreta of a marmot, and after dissection discovered in one a cyst measuring 375μ by 300μ, with a double wall and piriform apparatus. It is suggested that the life cycle of the Anoplocephalinae will possibly be solved by a study of coprophagus beetles.

The remainder of the paper is not of veterinary interest.—A. W. N. Pillers.

I. Cameron, T. W. M. (1933). **Comparative Pathology of Helminths.**—*Vet. Rec.* **13.** 325-331. [Address presented to the Central Vet. Ass. of Canada].

II. Freund, L. (1933). Die Bedeutung der Wirte für den Parasiten. [**The Importance of the Host to its Parasites**].—*Deuts. tierärztl. Wschr.* **41.** 314-315. [3 refs.]

I. In this address Cameron deals with the pathogenesis of the common

helminths of domestic animals. Following a general account of the various ways by which parasites may cause injury to their hosts, he gives what little is known of the special pathology of the common helminthiases.

II. Freund has previously called attention to the mistaken notion which considers all parasites to be harmful. In the present paper he discusses the relationship between intermediate and final hosts and emphasizes the point that it is against the interests of the parasite to injure either of these. In normal conditions there is a harmony between host and parasite only upset by continued reinfection, which brings the host-parasite relationship into the field of pathological parasitology.

—E. L. Taylor.

Roberts, F. H. S. (1932). **A Survey of the Helminth Parasites of the Domestic Fowl and Domestic Pigeon in Queensland.**—*Dept. Agric. & Stock. Queensland. Pamphlet.* No. 3. pp. 6. [6 refs.]

Roberts records the following parasites from Queensland :—

Domestic Fowl.

Cestodes :—
Davainea proglottina (Davaine, 1860).
Raillietina (*Ransomia*) *tetragona* (Molin, 1858) R.Bl., 1891.
Raillietina (*Skrjabinia*) *cesticillus* (Molin, 1858).
Hymenolepis carioca (Magahlhães, 1898).
Hymenolepis inermis Yoshida, 1910.

Nematodes :—
Ascaridia lineata (Schneider, 1866).
Heterakis gallinae (Gmelin, 1790).
Capillaria retusa (Railliet, 1893) 1915.
Capillaria columbae (Rudolphi, 1819).
Oxyspirura parvovum Sweet, 1910.
Acuaria (*Cheilospirura*) *hamulosa* (Diesing, 1851).
Acuaria (*Dispharynx*) *spiralis* (Molin, 1858).

Domestic Pigeon.

Cestodes :—
Raillietina (*Raillietina*) *nagpurensis* Moghe, 1925 ?

Nematodes :—
Ascaridia columbae (Gmelin, 1790).
Ornithostrongylus quadriradiatus (Stevenson, 1904).
Capillaria columbae (Rudolphi, 1819).

—A. W. N. Pillers.

Lane, C. (1933). **Diagnosis of Helminthic Infections : A Twelve Year Survey.** —*Trop. Dis. Bull.* **30.** 503-516.

This is a review of some 300 papers on this subject which have been abstracted in the *Trop. Dis. Bull.* during the past 12 years. Although the subject matter is human helminthology, it is of considerable veterinary and comparative interest. The author has worked on this aspect for several years and his division of it is as follows :—direct, subdirect and indirect.

Direct diagnosis is that in which the parasite itself is observed as it lies in, or leaves, the host ; subdirect, that in which an immature stage which leaves the host is allowed to grow into a less immature one and indirect that in which host reactions to the parasites are observed or provoked and recorded.

Under direct diagnosis, (a) faecal, (b) urinary, (c) blood and (d) X-ray examinations are considered.

(a) Spurious parasitism receives some attention, the eggs of *Heterodera radicicola* being specially mentioned. Egg counting techniques, concentrative methods and quantitative diagnosis are fully reviewed. Brown and Cort's

estimate that a female ascaris deposits about a quarter of a million eggs daily or 2,000 per gramme of faeces is quoted.

(b) and (c) Urinary examination is limited to a consideration of schistosome eggs and blood examination to species of microfilariae.

(d) An ascaris has been disclosed by failing to throw an X-ray shadow whilst lying within a barium meal. The calcified cysts of *Cysticercus cellulosae* threw shadows about 6 mm. long and those of *Trichinella spiralis* shadows 0·4 mm. long.

Subdirect diagnosis hardly interests the veterinarian. It is mainly concerned with human hookworms and schistosomes.

Under indirect diagnosis no reference is considered necessary with regard to actual clinical symptoms except creeping eruption. This is caused by *Ancylostoma braziliense*, *A. caninum* and *Urcinaria stenocephala* among nematodes. Most of the references relating to diagnosis of the injurious worm load seem to discredit the value of egg counts.

ANTIGEN REACTIONS. Positive precipitin reactions are obtained for *T. spiralis* in human beings some 30 days after infection, in which time the patient is likely to be either convalescent or dead. Positive immediate intradermal reactions are given by *Strongyloides stercoralis*. For schistosomiasis, snail's liver infected with *Schistosoma spindalis* gives clear, immediate and delayed reactions. Excellent results are obtained in the diagnosis of *Wuchereria bancrofti*, *Loa* and *Onchocerca*.

—A. W. N. PILLERS.

OBITZ, K. (1932). Wpływy geologiczne i hydrologiczne na rozszerzanie sie chorób pasorzytniczych. [**The Geological and Hydrological Influence upon the Spread of the Diseases caused by Parasites**].—*Wiadom. wet.* **11.** 97-104. [41 refs.] [Summary in German : abst. from orig.]

The author traces the relationship between the spread of parasites and the geological and hydrological conditions of the pastures in which the hosts graze. Infection with *Fasciola hepatica* occurs especially on the pastures where the ground is calcareous [muddy, damp and peaty, where bogs are often found]. [This appears to be an unusual occurrence.—Ed.] *Dicrocoelium dentriticum* is, however, found on warm and dry pastures with calcareous soil in middle and south Germany, in a zone of the Alps and sometimes in west Poland. *Dictyocaulus viviparus* is the cause of a severe epizootic along the coast, where there is marshy and calcareous ground, whilst *Dictyocaulus filaria* seldom appears on such ground, as its larvae prefer clean water. *Haemonchus contortus* and *Ostertagia ostertagi* are found in calcareous and muddy ground where rivers have overflowed their banks and also in damp and peaty ground which is regularly moist. Bunostomum behaves in a similar manner.

The observations about *Moniezia expansa* differ considerably, but the high-lying pastures, such as in Wales and Switzerland, seem to be free from them. Observations are made on the limited incidence of *Echinococcus alveolaris* in human beings in south Germany, Switzerland, Russia, Siberia and Japan.

—K. SZCZUDLOWSKI (LWÓW).

SOLOMON, S. G. (1933). **The Helminth Parasites of Dogs in Marseilles.**—*J. Helminthol.* **11.** 157-162. 1 table. [12 refs.]

Solomon has carried out a helminthological examination (*post mortem*) on 37 dogs from the Medical College in Marseilles. *Dipylidium caninum* proved to be the most common parasite, being present in 70·2 per cent. of the dogs, and *Taenia pisiformis* next with the unusually high incidence of 40·5 per cent. *Trichuris depressiusculus* and *Ancylostoma caninum* were not found. The author observes

that the absence of eggs from the faeces is by no means a reliable indication that the dog is free from parasites as it only proves that it is free from egg-producing females. A table compares his survey with eight others in different parts of the world.—E. L. Taylor.

Mönnig, H. O. (1933). Over Eenige Pluimvee-Wormen verzameld te Utrecht. [**Some Poultry Worms collected at Utrecht**].—*Tijdschr. Diergeneesk.* **60.** 468-469. 1 table.

An investigation was carried out on infestation of the digestive system of poultry with worms. Of the nematodes, *Ascaridia lineata*, *Heterakis gallinae*, *Capillaria columbae* and *C. longicollis* were often found in the intestines. *Acuaria hamulosa* was sometimes found in the wall of the gizzard. The tapeworms *Davainea proglottina*, *Raillietina cesticillus* and *Hymenolepis* were sometimes found in hens; of the trematodes, *Notocotylus attenuatus*, *Psilochasmus oxyuris* and *Hypoderaeum conoideum* were found in hens, ducks and swans respectively.

—A. Klarenbeek (Utrecht).

Bradley, B. (1933). **Some Observations on Australian Human Trematode Endemiology Based on Local Sheep Fluke Investigations.**—*Med. J. Australia.* Feb. 25th. 245-251. [6 refs.]

The author suggests that in view of the yearly lessening of the effective separation of Australia from other, and especially tropical and subtropical regions, a proper understanding of the conditions locally favourable or inimical to the establishment and spread of such diseases as schistosomiasis, paragonimiasis, etc., is a matter of urgency. The communication is founded on observations on the spread of liver fluke of sheep and allied trematode parasites of human beings already established in New South Wales.

It is assumed that, following the introduction of persons harbouring the trematodes in question, the establishment of endemic areas of infestation will depend upon the presence of suitable intermediate hosts. The dangers from importation of such hosts with water weeds, bulbs, goldfish, etc., are pointed out. Two forms of bilharzia are spread by two snail genera, of which certain species abound in New South Wales, and there is evidence that at least one of these snails, *Bulinus brazieri*, does transmit a schistosome, though there is no evidence as to the identity of the adult schistosome. *Cercaria greeri*, described by the author [(1926). *Med. J. Australia.* May 8th. 519.] is of the same class as the trematode concerned in both types of bilharzia and in the Japanese Katsurada disease. Besides numerous *Bulinus* spp. there are several *Planorbis* spp. present which may serve as intermediate hosts for the human schistosomes. The possibility also exists of snails already present becoming adapted to act as hosts for trematodes of the genera *Paragonimus*, *Metagonimus* and *Clonorchis*. It is suggested that public health authorities should pay due regard to the question of introduction of human carriers and the importation of intermediate hosts.—H. McL. Gordon.

Willey, C. H. (1933). **The Lymph System of** *Zygocotyle lunatum* **(Trematoda Paramphistomidae).**—*Parasitology.* **25.** 242-247. 3 figs. [11 refs.]

Willey has made a careful study of the lymph system of specimens belonging to the species *Z. lunatum* collected from the domestic duck, goose and ox. The numbers and disposition of the lymph vessels is considered to be of importance in the classification of the Zygocotylinae, but has not previously been worked out for *Z. lunatum*.

Willey's investigation shows, contrary to what had previously been supposed,

that only one pair of longitudinal lymph vessels are present, and this will necessitate a revision of the diagnosis of the subfamily Zygoctylinae.—E. L. Taylor.

Rao, M. A. N. (1933). **Bovine Nasal Schistosomiasis in the Madras Presidency with a Description of the Parasite.**—*Ind. J. Vet. Sci. & Anim. Husb.* **3.** 29-38. 2 text figs., 12 figs. on 3 plates. [12 refs.] [Reported *verbatim* in *Ind. Vet. J.* **10.** 19-29].

Nasal granuloma of cattle is prevalent in Madras and is due on the one hand to a rhinosporidium and on the other to a schistosome. The present paper is devoted to the latter form of the disease. The symptoms are sneezing and thick mucous nasal discharge, which later becomes mucopurulent and is often blood-tinged. Finally there is snoring. The period of incubation is long and a year may elapse before lesions can be detected in the nostrils. Macroscopically these consist of masses of growths studded with small surface nodules, each containing a minute abscess which contain schistosome eggs. The histology of the lesions is figured and described. Photomicrographs show transverse sections of the male and female worms and eggs *in situ*. There is no reference to lesions in any other part of the body and no account of complete *post-mortem* findings. Diagnosis can be confirmed by finding schistosome eggs in nasal washings.

A buffalo and a sheep were found to be suffering from the disease ; faeces of the former contained eggs of *S. spindalis*.

From the nasal growths one entire male, one pair of adult worms and some pieces of males and ovigerous females were obtained. The male is 7·2 mm. long, and the cuticle is tuberculated on the dorsal surface behind the ventral sucker ; the tubercles bear spines which are arranged in irregular longitudinal rows, 18 to 20 in number. There are 2, 3 or 4 testicular sacs one behind the other in the mid-dorsal line behind the ventral sucker. The female is 7 mm. long with the ovary at the beginning of the posterior third of the worm. The eggs are boomerang-shaped, one side being convex and the other concave ; they measure 380μ to 420μ by 50μ to 55μ.

The author states that the parasite differs from other schistosomes found in Indian cattle in that :—(1) the cuticular tubercles appear to be more pronounced ; (2) the posterior extremity of the male is truncated ; (3) there are 2 to 4 testicles ; (4) the common caecum of the female is short and (5) the ova are boomerang-shaped and appear to be longer.

He proposes the name *S. nasalis* for it and figures a male and female. [It is quite likely that a number of these differences would disappear if a larger series of worms were examined and compared with a number of individuals of the species it appears most closely to resemble].—A. W. N. Pillers.

Creech, G. T., & Miller, F. W. (1933). **Nasal Granuloma in Cattle.**—*Vet. Med.* **28.** 279-284. 4 figs. [10 refs.]

" Snoring disease " has long been known to exist among cattle in India and Malkani [this *Bull.* **4.** 112.] has shown it to be due to *Schistosoma spindalis* or a closely related species.

In this paper the authors describe a disease of cattle observed in Louisiana the symptoms and lesions of which are very similar to, if not identical with, the condition encountered in India.

Although the authors have not identified the causal agent, they consider that their failure to isolate a bacterial agent, their inability to transmit the disease, the known slow progress of the condition, together with the lack of evidence that it

spreads from animal to animal, all point to its being the result of parasitic infestation —Gwilym O. Davies.

Wetzel, R. (1932). Zur Kenntnis des weniggliedrigen Hühnerbandwurmes Davainea proglottina. [**On the Common Small Tapeworm of Poultry,** *Davainea proglottina*].—*Arch. wiss. prakt. Tierhlk.* **65.** 595-625. 12 figs., 1 plate. [54 refs.]

Wetzel here gives a very good account of *Davainea proglottina*, the morphology of its various developmental stages and the details of its life history. At average summer temperatures the cysticercoid is found to reach the infective stage after 20 to 22 days in the intermediate host, and to develop to sexual maturity in the final host after 12 to 16 days. The ripe proglottids appear rhythmically in the faeces of the fowl, commencing at about 11 a.m. and reaching maximum numbers at 3 to 4 p.m. They again disappear at 6 to 7 p.m., the breaking away of proglottids probably resulting from the entrance of food in the duodenum after the morning feed of the fowl. The onchospheres cannot withstand drying and even under moderately moist conditions only retain their infectivity for about five days. Frost kills them in a very short time. *Arion empiricorum*, *A. hortensis*, *A. circumscriptus*, *A. intermedius* and *Cepaea nemoralis* were found to act as intermediate hosts as well as the species already known to do so.—E. L. Taylor.

I. Bhalerao, G. D. (1933). **On a Few Nematodes Parasitic in Goats at Muktesar.**—*Ind. J. Vet. Sci. & Anim. Husb.* **3.** 163-165. 3 figs. [10 refs.]

II. Bhalerao, G. D. (1933). **On Two Unrecorded Nematodes from the Abomasum of Cattle in India.**—*Ibid.* 166-173. 13 figs. on 5 plates, 2 tables. [7 refs.]

I. The author records *Oesophagostomum asperum* Railliet and Henry, 1913, *Gongylonema verrucosum* Giles, 1892 and *Setaria buxi* n. sp. from the hill goat (*Capra sibirica*) at Muktesar, United Provinces of India, for the first time. The latter species is described and figured.

II. This is an account of the finding of *Haemonchus similis* Travassos, 1914 and *Capillaria bilobata* n. sp. in the abomasum of cattle at Muktesar. The last named is described, figured and compared, in two tables with the males and females of four other species of *Capillaria* from cattle in Europe and America.

Whilst there is very little difference in the case of the females, in the males the spicules and lateral alae are much smaller. The spicular sheath is much smaller than the spicule and is bilobed instead of being tubular as in the other species.—A. W. N. Pillers.

Vattuone, A. B. (1933). **A New Intradermal Reaction in Ankylostomiasis.**—*Med. J. Australia.* May 27th. 645-647.

Antigen was prepared from adult parasites expelled after thymol treatment. The method of preparation is not stated. For the test an intradermal inoculation is made on the forearm and is controlled by a similar inoculation of sterile normal saline. A positive reaction is shown by the formation, after 15 to 30 minutes, of a clear whitish blister surrounded by a hyperaemic circle about 2 cm. in diameter, with an irregular dusky margin. Control inoculation with saline shows the blister much less distinctly, it being not so white in colour and the surrounding ring being only 1·2 cm. in diameter and paler than the surrounding skin. The reaction is more intense in patients severely infested, but even carriers with light infestations give decided reactions. The maximum effect is noted 30 to 40 minutes after inoculation. Successful application of this test means the avoidance of the

unpleasant and unhygienic task of faecal examination and, in addition, there is a great saving of time. It is claimed that, whereas lightly infested carriers may not be detected by faecal examination, the intradermal test will show these cases.

—H. McL. Gordon.

Kauzal, G. (1933). **Observations on the Bionomics of Dictyocaulus Filaria. With a Note on the Clinical Manifestations in Artificial Infections in Sheep.** —*Austral. Vet. J.* **9.** 20-26. 4 figs. [9 refs.]

Infective larvae of *D. filaria* were found to develop at continuous temperatures of 4°-5°C., and such larvae possessed greater longevity than those developed and stored at room temperature. Artificial infestations of guinea pigs and lambs were made with the following results :—24 hours after infestation of a guinea pig, a few ensheathed third-stage larvae were found in the liver ; 24 hours after infestation of a lamb, ensheathed third-stage larvae were recovered in great numbers from the mesenteric lymph glands only ; three and five days after infestation, ensheathed third-stage larvae were still present in the mesenteric glands of lambs and after the latter period larvae undergoing the third ecdysis were present in the lungs. After eight days, in both the lamb and the guinea pig, fourth-stage larvae were recovered from the bronchi. After 18 days, young adult males and females were recovered from the bronchi of guinea pigs.

Clinical observations were based on 28 cases of artificial infestation. Coughing was observed as early as the 16th day, but sometimes not till the 30th day. Larvae were not found in the faeces before the 26th day ; more usually not before the 30th day. Symptoms of infestation usually became marked 30 to 40 days after infestation and in addition to the characteristic cough there was mucoid discharge from the eyes and nose. In severe cases, respiration was hurried, shallow and apparently painful. Death, when it occurred, was due to anoxaemia, marked cyanosis being present immediately before death.

Clinically the disease begins three or four weeks after infestation, at which time, by mechanical obstruction of the smaller bronchi, atelectasis is produced. Repeated blood examinations made on infested lambs did not present any marked changes. Infested lambs showed some check in weight gains from the fourth to the eighth weeks and finally threw off the infestation completely in 12 to 14 weeks. Observations made on the number of larvae per gramme of faeces, in relation to the degree of infestation found *post mortem*, showed considerable variation in the ratio of larvae to female worms. It was concluded that the degree of infestation commonly met with in the field in New South Wales acts as a predisposing cause of disease, both accentuating the effects of other parasites and increasing susceptibility to pulmonary complications rather than being the immediate cause of death.

—H. McL. Gordon.

I. Gordon, H. McL. (1933). **Some Ovine Trichostrongylids Reported from Australia for the First Time, with a Description of Trichostrongylus Longispicularis sp. nov. from a Sheep.**—*Austral. Vet. J.* **9.** 34-37. 2 figs. [5 refs.]

II. Gordon, H. McL. (1933). **A Note on a Case of Trichostrongylus Infestation in a Horse.**—*Ibid.* 68.

I. This paper records the presence of the following parasites in sheep in Australia for the first time :—*Cooperia punctata*, *C. McMasteri* and *Trichostrongylus probolurus*. *T. longispicularis* is described as a new species. A note is added on the distribution of *Trichostrongylus* spp. in Australia. Parasites of this genus have been recorded from places having such varied climatic conditions as Tasmania and the hot dry western plains of New South Wales (Bourke). Specimens have

also been found in central western Queensland. It would thus appear that the genus must be particularly well adapted to wide changes in its external environment. Study of material from sheep carrying infestation with *Trichostrongylus* spp. has revealed the presence of six species in Australia, namely *T. instabilis*, *T. vitrinus*, *T. rugatus*, *T. extenuatus*, *T. probolurus* and *T. longispicularis*. In the majority of cases the prevailing species has been *T. instabilis*, but recently several cases showing a majority of other species have been examined. Numerous cases showed almost 80 per cent. *T. vitrinus* ; in others again *T. rugatus* was the chief species present.

II. This paper records results of an egg count by the Stoll method on the faeces of a horse in poor condition where 10,000 eggs per gramme were found. On faecal culture larvae were obtained which closely resembled those of ovine *Trichostrongylus* spp. It was therefore surmised that the infestation was due to *T. axei* (Cobbold, 1880) Railliet and Henry, 1909. This was the first record of the species in Australia. It being now generally accepted that *T. axei* of equines and *T. extenuatus* of ruminants are one and the same parasite, the possible existence of two strains of a single true species was discussed. An egg count of a lamb infested with *Trichostrongylus* spp. was offered for comparison. The count was 10,000 eggs per gramme and at *post-mortem* examination some 10,000 adult *Trichostrongylus* spp. were found. Taking into consideration the bulk of ingesta in a horse, it is suggested that the egg count of 10,000 represented an infestation with approximately 100,000 adult *T. axei*, which almost certainly accounted for the poor condition of the horse.—H. McL. Gordon.

Hsu-Hsi-fan. (1933). **On Thelazia callipaeda Railliet and Henry, 1910, Infection in man and dog.**—*Arch. Schiffs- u. Trop.-Hyg.* **37.** 363-369. 3 figs., 1 table. [16 refs.] [Orig. in English].

The author reviews the records of *Thelazia callipaeda* from the conjunctival sac of man and dogs in the Punjab and China. Measurements and descriptions are given from five males and eight females of human origin, and from five males and five females from dogs in China. Reference is made to *T. californiensis* Price from dogs in the United States. It is stated that the two species appear to be distinct and that the former is now known to occur in human beings, the dog and the rabbit.—A. W. N. Pillers.

Nielsen, M. (1933). Undersøgelser over Forekomsten af Habronema-Arter som Snyltere hos Hesten i Danmark. [**Investigations into the Occurrence of *Habronema* Species as Parasites of the Horse in Denmark**].—*Maanedsskr. Dyrl.* **44.** 641-649. 3 figs. [13 refs.]

In 1927 the author published a paper on habronemiasis in horses in Denmark (first described by Selmer in 1902) and pointed out that this disease, as elsewhere, is due to habronema larvae. As yet, however, adult habronema has not been demonstrated in Denmark.

In the course of one and a half years, Nielsen has examined the stomachs of 172 horses and found habronema in three cases. The examination proved that all three species, *Habronema megastoma*, *H. microstoma* and *H. muscae*, occur in Denmark as parasites of the stomachs of horses. They do not seem, however, to be frequent in Denmark.—H. Lorenzen (Sønderborg).

Mass, I. Z. (1932). Badania nad eozynofilja krwi u swin przy wlosnicy. [**Investigations on Eosinophilia in Swine Trichinosis**].—*Przeglad Wet.* **45.** 547-566. 6 tables, 4 graphs. [44 refs.] [Summary in German : abst. from orig.]

With a view to clearing up the problem of eosinophilia in swine trichinosis,

the author carried out experiments on nine pigs four to five months old, one being kept as a control. Each of the remaining four pairs was fed on rabbit flesh or pork containing trichinae. The first pair received 100, the second pair 200, the third pair 1,000 and the fourth pair 5,000 trichinae. Before feeding with the infested flesh, the blood of each animal was examined to determine the quantity and variety of the different leucocytes. Eosinophilia occurs some days after infestation and reaches its highest level between the 20th and the 24th day after infestation. Eosinophilia depends probably upon the movement of the parasites from the intestinal canal and the highest point was at the time of penetration of the larvae into the muscular tissue.

In the first pair of pigs infested with 100 trichinae, eosinophiles exceeded the total amount of leucocytes by 10 per cent. ; in the second pair, infested with 200 trichinae, by 12 per cent. ; in the third pair, infested with 1,000 trichinae, by 20 per cent. and in the fourth pair, infested with 5,000 trichinae, by 27·5 per cent.

It is concluded that (1) there is a close relationship between the quantity of the parasites and the intensity of the eosinophilia ; (2) that the pig being often naturally infested with the trichinae is not a reliable subject for experiments of this kind and (3) that the diagnosis of trichinosis in swine by means of eosinophile count is unreliable, as the swine are infested at the same time with a number of other kinds of parasites which also cause eosinophilia.

—K. Szczudlowski (Lwów).

Maass, Z. I. (1933). Ueber Eosinophilie im Schweineblut bei Trichinose. **[Eosinophilia in the Blood of Pigs suffering from Trichinosis].**—*Zlb. Bakt. I.* (*Orig.*). **129.** 29-34. 4 figs., 1 table. [10 refs.]

Maass states that no reference is found in the literature to eosinophilia in the most important trichina host, the pig. The presence of other helminths influences the blood picture. His researches showed that the number of eosinophile cells in normal pigs was from 0·5 to 4·5 per cent. of the leucocytes. Eight pigs, in 4 series of 2, were infected with encapsulated trichinae ; each series was given 100, 200, 1,000 and 5,000 trichinae respectively and one pig was kept as a control. Blood examinations were made daily for 24 days in the 1st series, 28 in the 2nd, 42 in the 3rd and 4th and for 88 days in the case of the control. A graph for each series shows the percentage daily increase or decrease of eosinophiles. The results are tabulated.

The author concludes that the intensity of the eosinophilia which soon appears is in direct proportion to the quantitative infection by trichinae. It is evident some few days after infection and reaches its height in 20 to 24 days when the young larvae have entered the muscles. With pigs infected with 100 trichinae it was 10 per cent., with 200, 12·5 per cent., with 1,000, 20 per cent. and with 5,000, 27·5 per cent. After this it falls rapidly for about 24 hours and then gradually returns to normal.—A. W. N. Pillers.

IMMUNITY.

I. Irwin, M. R. (1933). **Inheritance as a Factor in Resistance to an Infectious Disease. I. The Uniform Reaction of an Inbred Strain of Animals. II. Differential Host Reactions and the Effects of Selection within a Population. III. The Distribution of Litter Mortalities in the Host Populations. IV. Tests for Evidence of an Acquired Immunity in the Resistant Population. V. The Correlations between Resistance of**

the Host and Certain Measured Variables.—*J. Immunol.* **24.** 285-295, 297-312, 313-318, 319-327 and 329-342. 31 tables. [36 refs.]

VI. Irwin, M. R., & Hughes, T. P. (1933). **Inheritance as a Factor in Resistance to an Infectious Disease. VI. The Correlation between Resistance and the Bactericidal Power of the Whole Blood.**—*Ibid.* 343-348. 3 tables. [7 refs.]

VII. —. (1933). **The Inheritance of Immunity.**—*Lancet.* **224.** 1293-1294. [7 refs.]

I. In an attempt to produce a strain of animals all reacting in an identical manner to infection with pathogenic organisms, the author has experimented with a strain of Wistar albino rats descended from one pair whose ancestors had been inbred brother to sister for 48 generations. As a test infection, a standard dose of *Bact. enteritidis* was injected intraperitoneally. Over a four-year period, 723 inbred rats were injected; the mortality was 93·5 per cent. as opposed to an 84·7 per cent. mortality in random-selected control stock. An ideal strain would be one in which all animals died if infected with a minimum lethal dose and all survived if infected with any smaller dose.

II. Selection with a random-mated stock of rats is effective in isolating lines producing an appreciable number of resistant individuals over that of a normal population, but in subsequent generations this resistance fades away.

III. Clear evidence is produced of the variation to be anticipated between resistant individuals in their ability to transmit the factors determining resistance to their offspring. Thus the progeny of one resistant male showed an average mortality of 51·8 per cent. whilst those of another similarly resistant individual showed a mortality of 97·8 per cent.

IV. The mortality of progeny of resistant males crossed with susceptible females was compared with that of the progeny of the reverse cross. The resistant males produced the greatest percentage of resistant stock. This eliminates the possibility of a transference of passive immunity, which in all cases comes from the dam. A comparison of the mortalities amongst the progeny of carriers and non-carriers showed no differences other than those depending upon their genetic line of descent.

V. A correlation of body weight with mortality rate has shown that a high mortality is found amongst animals failing to approach the normal growth of their type. Since body weight is itself partly dependent upon hereditary factors, it cannot play an important role in mortality differences between strains.

VI. The whole blood of 2 inbred strains of rats highly susceptible to *Bact. enteritidis* showed practically no bactericidal activity against this organism. Those individuals showing varying degrees of bactericidal activity were distributed equally between the surviving and non-surviving groups.

VII. The drawback to Irwin's technique [abstracted above] is that he breeds from animals which have survived infection. Webster [(1933). *J. Exp. Med.* **57.** 793.] judges the resistance factor of the parents according to the degree of survival of their first litter, parents never being submitted to infection until their breeding careers are over.

An important line of investigation is the question of the specificity or non-specificity of the genetic factor of resistance, since evidence on this point is meagre and conflicting.—E. J. Pullinger.

—. (1932). **Immunity and the Nervous System.**—*Lancet.* **223.** 1342.

This annotation deals with the work of Metalnikov who has made many observations on the association of the nervous system and immunity reactions.

Some of his observations appear to indicate that immunity reactions may be conditioned reflexes. For a period of 20 to 30 days he has associated in rabbits the internal stimulus of the injection of a killed suspension of *Vibrio cholerae* with an external stimulus such as warming or rubbing an ear or the sounding of a horn. Thereafter the external stimulus alone has aroused the characteristic responses o cellular changes and production of antibodies. It is added that a sufficient case has been made out for careful repetition of his work and that it may help to analyse why a determination to get well is as important as a good nurse in deciding the outcome of illness.—R. Lovell.

I. Green, W. J. (1933). **Notes on the Double Intra-dermal Tuberculin Test carried out in Durban and Neighbourhood.**—*J. S. Afric. Vet. Med. Ass.* **4.** 27-31. 6 tables.

II. Spicer, A. (1933). **Observations on the Testing of Cattle for Tuberculosis by the Double Intradermal Method.**—*Vet. Rec.* **13.** 474-477. 1 table.

I. The author, having applied the test to about 5,000 animals, concluded that it was fairly easily interpreted and was efficient in 94·4 per cent. of cases. The existence of border-line reactions was recognized and it was suggested that such animals should be retested in conjunction with a subsidiary test. It was noted that of 3,411 animals tested in the Durban area, 2,195 were negative, 993 were positive and 223 were doubtful : on retesting the latter group, 121 gave a positive and 102 a negative reaction. This test revealed a high percentage of infection ; moreover, *post-mortem* statistics showed that at least 23·4 per cent. of the reactors were generalized cases, and 6·4 per cent. were affected with mammary lesions.

II. A general description of the results of the double intradermal test in the field. Stress is laid upon the importance of recognizing slight oedema in reactions, mention being made of 200 cases in which glycerine broth was injected as a control measure without any indication of diffuseness. It is also stated that, in cattle giving doubtful reactions, the subsequent application of the subcutaneous test has always given negative results although some of the animals were subsequently proved to be tuberculous.—R. E. Glover.

Feldman, W. H. (1933). **The Sensitivity of Chickens to Tuberculin Following Exposure to Different Varieties of Acid-Fast Bacilli.**—*J. Amer. Vet. Med. Ass.* **83.** 344-357. 3 figs., 3 tables. [12 refs.]

A series of experiments with chickens, to obtain information concerning the specificity of the tuberculin reaction and to determine whether acid-fast bacteria other than the *Mycobact. tuberculosis* would provoke in them sensitivity to tuberculin. The results of the experiments, which are very fully described, show that of 20 chickens inoculated with virulent strains of *M. tuberculosis* of human, bovine and avian origin, all revealed demonstrable sensitivity to either avian or mammalian tuberculin, and 10 of the series reacted simultaneously to both tuberculins. Of 36 chickens injected with acid-fast bacteria other than *M. tuberculosis* of warm-blooded animals, only three reacted positively to tuberculin and none of these showed significant lesions at necropsy.—Ll. E. W. Bevan.

Olitzki, L. (1933). **Electric Charge of Antibodies.**—*J. Immunol.* **24.** 505-512. 6 tables. [16 refs.]

Previous work has indicated that the electrical properties of antibodies may be obscured by associated proteins. In order to determine whether serum proteins and antibodies behave differently, the migration of *Bact. typhosum* agglutinins was studied in untreated horse serum, in the globulin fractions and in a protein-free

state respectively, using the technique described in a previous article [see this *Bull.* **3.** 423].

In experiments with protein-containing solutions, the agglutinins migrated to the positive pole at pH 4·0 and over, and to the negative pole at pH 3·0 to 3·4. With protein-free solutions obtained by absorbing the protein on to kaolin, it appeared that the agglutinins carried a negative charge over a range pH 10·0 to 3·4 (below that point they were too sensitive to acid reactions to make measurements possible).—R. E. Glover.

McKhann, C. F., & Chu, F. T. (1933). **Antibodies in Placental Extracts.**—*J. Infect. Dis.* **52.** 268-277. 1 fig., 3 tables. [36 refs.]

It has been demonstrated that in animals both the placenta and the mammary glands play some part in the transmission of immune bodies from mother to young, and in this paper the authors have studied the part played by the placenta in the transmission of immune bodies to the human infant. Normal placentas were obtained and extracted with 2% NaCl. The proteins present in the extracts were fractionated by means of saturated solutions of $(NH_4)_2SO_4$. By this means it was possible to demonstrate the presence of substances, presumably antibodies, which would neutralize diphtheria toxin, blanch scarlet fever rashes, neutralize poliomyelitis virus and prevent measles in exposed, susceptible patients.

—J. A. Nicholson.

Wedum, A. G. (1933). **Investigation of Certain Synthetic Glucosides for Antigenic Properties.**—*J. Infect. Dis.* **52.** 203-208. 1 table. [9 refs.]

Considerable theoretical and practical importance is attached to the question whether or not any substance entirely free from protein can act as a complete immunological antigen. Most of the successful work has been done with extracted antigens which probably retained some protein as an impurity. Ehrlich failed to demonstrate antibody formation by non-protein compounds. Ford, some years ago, isolated an antigenic nitrogenous glucoside from a mushroom. In the present study, 22 glucosides of known composition were synthesized and injected into guinea pigs. They represented a wide range of structural formulae and solubilities ranging from simple solutions through suspensoids to suspensions.

No antigenic effect was produced by any of the compounds tested. Pseudo-agglutination and pseudo-precipitation sometimes occurred and were detected by suitable controls.—George Slavin.

Bretey, J. (1933). Sur les propriétés allergisantes des *Nocardia* et des *Streptothrix* et sur la toxicité de leurs extraits. [**The Allergizing Properties of *Nocardia* and *Streptothrix* and the Toxicity of their Extracts**].—*C. R. Soc. Biol. Paris.* **113.** 53-55.

Using four strains of the genus *Actinomyces* referred to by the author as *Nocardia asteroides*, *N. eppingeri*, *Streptothrix sanfelice* and a streptothrix isolated from butter, he demonstrated that in guinea pigs infected by these organisms allergic manifestations could be provoked comparable to the tuberculin reactions. Crossed allergic reactions also occurred, but were less marked. Tuberculous guinea pigs also reacted to these extracts, two of which proved to be very toxic.

—Gwilym O. Davies.

I. Burnet, F. M. (1933). **Immunological Studies with Phage-Coated Bacteria.**—*Brit. J. Exp. Path.* **14.** 93-100. 1 fig., 3 tables. [5 refs.]

II. Burnet, F. M. (1933). **A Specific Soluble Substance from Bacteriophages.**—*Ibid.* 100-108. 6 tables. [7 refs.]

I. The author shows that bacteria on which certain phages have been adsorbed can be specifically agglutinated by antiphage serum, and can be used to absorb antiphage from an immune serum. With one phage it was shown that formalin-inactivated phage could be adsorbed by bacteria and endow them with the specific reactivity toward corresponding antiphage.

II. A phage-specific soluble substance is present in phage-free ultrafiltrates of lysed cultures. This substance is not adsorbed by bacteria sensitive to the corresponding phage and does not represent a soluble lysin.—S. H. GAIGER.

DE ZEEUW, F. A. (1932). Bijdrage tot de Kennis van het Wezen en de Toepassing van het Antivirus (Besredka). [**Contribution to the Knowledge and the Application of the Besredka Antivirus**].—*Inaug. Diss. Utrecht.* pp. 127. 26 tables. [118 refs.]

The author raises the question whether an antivirus in the sense used by BESREDKA really does exist, and concludes that the answer is both in the affirmative and the negative.

He agrees with BESREDKA that old broth culture filtrates possess an immunizing quality and that the development of the immunizing principle is connected with the cessation of growth frequently observed in old broth cultures. Some antivirus is, however, produced before growth ceases and its amount is not dependent upon the death of the bacteria.

In tests with animals, it appears that the results depend upon the bacteria used for the preparation of the antivirus. Potent antivirus can only be expected if freshly isolated strains of bacteria are used. The nature of the antivirus is not known.

It is not known whether all bacteria can produce antivirus. Swine erysipelas culture filtrates show a distinct prophylactic effect on swine, but have no protective power for pigeons.

In the preventive treatment of strangles better results are obtained with antivirus than with serum : antivirus has the additional advantage that it is cheaper than serum.—B. J. C. TE HENNEPE (ROTTERDAM).

I. JONES, F. S., & LITTLE, R. B. (1933). **Changes in Bacterial Volume as the Result of Specific Agglutination.**—*J. Exp. Med.* **57.** 721-727. 5 tables. [7 refs.]

II. JONES, F. S., & LITTLE, R. B. (1933). **The Significance of Changes in Antigenic Volume as the Result of Specific Agglutination.**—*Ibid.* 729-739. 2 text figs., 3 tables. [4 refs.]

I. It has been shown by various workers, that globulin from the immune serum is precipitated on the surface of bacteria during agglutination. If this is true, bacteria should increase in volume during agglutination. To test this point positive and negative sera were incubated in capillary tubes with the appropriate antigens and centrifuged. In general, the increase in volume was proportional to the concentration of the immune serum. Serum previously absorbed with the specific organism did not increase the volume. Treated organisms, after washing twice, retained their original volume, showing that the substances responsible for the increase were attached to the organisms.

II. As the concentration of the antiserum increased, the increase in volume of the antigen became more marked but, as a rule, showed no tendency to become constant in the more concentrated dilutions.

In the case of non-motile organisms, when the increase in volume was about 16 per cent., nearly all the organisms were agglutinated and when it approached

20 per cent. agglutination was complete. The figures for motile bacteria were more variable, but the averages were similar.

Sensitized collodion particles and bacteria were agglutinated and the amount of protein taken up was determined. Collodion particles gained little in volume when agglutinated with specific antiserum, although the amount of protein removed from the serum was considerable. The increase in volume shown by bacteria was much greater than could be accounted for by the amount of protein removed. Collodion particles probably have an irregular surface and deposited protein does not hold the particles apart to any great extent when packed with the centrifuge. Protein is probably deposited on bacteria on small areas and forming pads in this way increases the volume of the antigen. Calculations show that the protein taken up by *Br. abortus*, if spread evenly over the whole surface of the organism, would form a layer $0{\cdot}025\mu$ thick, whereas for *Bact. aertrycke* the layer would be $0{\cdot}05\mu$ thick. Layers of the dimensions stated would not increase the volume of the antigen to the extent found by experiment.

No appreciable increase in size was found in organisms examined microscopically after treatment with the specific antiserum.—George Slavin.

Condrea, P., & Poenaru, Hélène. (1933). L'influence des dilutions sur la toxicité de la toxine tétanique. [**The Influence of Diluents on the Toxicity of Tetanus Toxin**].—*C. R. Soc. Biol. Paris.* **112.** 1482-1484.

Condrea, P., & Poenaru, Hélène. (1933). Recherches sur la nature de la toxine tétanique. Influence de la peptone sur la toxicité de la toxine tétanique. [**The Nature of Tetanus Toxin. Influence of Peptone on the Toxicity**].—*Ibid.* 1484-1487.

The toxicity of diluted tetanus toxin varies with the diluent. Peptone and salt solutions augment the toxicity, whilst glucose solution, on the other hand, appears to inhibit the toxic action. With sodium chloride or glucose solution the same effect can be produced by inoculating it into the test animal separately from the toxin. Both these substances react in a similar manner on any tetanus toxin whatever its age, purity, or toxicity. Salt appears to facilitate and glucose to inhibit toxic absorbtion and fixation by the tissues.

Peptone acts differently ; it has greater augmentary powers than salt, but the degree of augmentation is very variable, best results being obtained from the purer, more concentrated toxins. It is suggested that some non-specific substance in commercial peptone is capable of activating dormant toxin. It is also suggested that *Clostridium tetani* really elaborates a protoxin, not a toxin, and that this protoxin is activated in cultivation by the non-specific substance in peptone broth.
—Norman Hole.

DISEASES, GENERAL.

Gerlach, F. (1933). Tierseuchen und Tierseuchenbekämpfung in der Turkei. [**Contagious Diseases of Animals in Turkey, and their Control**].—*Wien. tierärztl. Mschr.* **20.** 193-209 and 241-257. 11 tables, 10 charts, 11 maps on 4 plates. [2 refs.]

At the request of the Turkish Government Gerlach spent three months in Turkey during the summer of 1932 in order to report on the reorganization of the measures for combating contagious diseases of animals. He made a thorough study of agricultural conditions and a survey of each disease. His report contains

a wealth of clinical and statistical material concerning rinderpest, anthrax, glanders, rabies, foot and mouth disease, blackleg, piroplasmosis, infectious pneumonia of goats, sheep and goat pox and poultry diseases.

Rinderpest is frequently complicated with piroplasmosis, and the use of blood for immunization has been superseded by cerebrospinal fluid. In the last decade the total financial loss from rinderpest was over £5,500,000 (Turkish). Tahssin Bey has produced a rinderpest dry vaccine which will keep several months and gives a very high standard of immunity. Turkey acts as a barrier against the introduction into Europe of infection from east and south.

Nearly 5 per cent. of animals in the areas affected with anthrax die of the disease and about 150 people contract anthrax every year owing to the lack of education of stockowners.

Glanders is widespread in Turkey, in spite of the fact that all imported horses are tested with mallein. In the interior a complicated method of eradication is adopted but is unsuccessful. Horse-troughs supplied from surface water spread the infection and are now being abolished.

Protective inoculation against rabies has not yet been employed, but is recommended by the author, who gives a detailed account of his visit to the Pasteur Institute at Stamboul.

Foot and mouth disease occurs regularly every year over a wide area, rising to a peak in March and April. It is spread by nomad communities and the movement of cattle for slaughter purposes, the main source of infection being Persia and Iraq. The European side of Turkey has been free from the disease since 1930.

Blackleg is rare, epizootic abortion is unknown, and from a recent trial of the intrapalpebral tuberculin test it would appear that only 6 per cent. of cattle suffer from tuberculosis.

Haemorrhagic septicaemia in buffaloes is being controlled by protective inoculation. Piroplasmosis is extraordinarily widespread.

From infectious pneumonia in goats, the nature of which is little known, the mortality varies between 40 to 90 per cent. Gerlach describes the symptoms and states that it is a sero-fibrinous pleuro-pneumonia.

Sheep and goat pox are found everywhere ; sheep are highly resistant to the disease, and it runs a mild course in goats.

Fowl cholera, fowl plague, fowl diphtheria and fowl typhoid are found, but until 1928 no notice was taken of them. In fowl cholera and fowl typhoid a mixed serum has been found useful, but vaccine inoculation has not always been successful. There has been only one case of spirochaetosis.

The author concludes with a summary of his recommendations for an improved veterinary control of contagious diseases.—F. Bullock.

—. (1933). **Report of Committee on Transmissible Diseases of Swine.**—*J. Amer. Vet. Med. Ass.* **82.** 515-517.

During recent times, swine erysipelas has caused heavy loss in several of the mid-western and principal pig-breeding states. There has been a considerable increase in the number of outbreaks and, while this may be explained in part by greater attention to diagnosis, there would appear also to be some increase in the incidence of the disease.

Attention is directed to the possible dissemination of the infection through swine fever virus used for the serum-virus inoculation against swine fever obtained from pigs in the early stages of erysipelas.

The committee, while recognizing the value of anti-swine erysipelas serum, points out the necessity for the adoption of sanitary measures.

Swine fever is still the disease of greatest economic importance in pigs in the United States.—T. M. Doyle.

—. (1932). **Report of the Special Committee on Poultry Diseases.**—*J. Amer. Vet. Med. Ass.* **81.** 512-515. [Presented at 69th Ann. Meet. Amer. Vet. Med. Ass., Atlanta, Georgia, 1932].

This Committee was apparently formed to collect information on poultry diseases for the guidance of the members of the American Veterinary Medical Association.

The Committee reports that the use of the agglutination test for the detection of pullorum disease is on the increase. It considers that intensive testing in order to produce flocks free of this disease from which new flocks are to be raised is better practice than wholesale testing of large numbers.

Paralysis is being encountered, but the incidence is not usually very high in a flock. It is often associated with tumours. The Committee recommends that a uniform plan for the detection, control and eradication of avian tuberculosis should be formulated.—Norman Dobson.

—. (1933). **Peg-Leg in Cattle.**—*J. Sci. & Indust. Res. Australia.* **6.** 129-130.

This is a note on preliminary investigations carried out by R. B. Kelley on " peg-leg " of cattle, a disease which exists in certain parts of Queensland and appears to be due to a mineral deficiency (probably phosphorus). A survey of the distribution of the disease has been made and clinical data collected. The disease is most prevalent on poor country and in dry seasons, and in females subjected to the strain of reproduction. The symptoms are emaciation, arthritis, fragile bones, arched back and stiffness of gait. Death often ensues.

—W. I. B. Beveridge.

Bédaride. (1933). Une enzootie de myoglobinuria à caractère atypique. [**Atypical Enzootic Myoglobinuria**].—*Rev. vét. et J. Méd. vét.* **85.** 5-12.

Describes a form of equine enzootic myoglobinuria of unknown aetiology occurring in the Vosges, first observed in 1931 and again in the same geological zone in 1932.

It appears to have no relation to myoglobinaemia paralytica [see this *Bull.* **1.** 234.], but resembles the disease described by Scheicher in Austria and Bavaria in 1927. It occurs in horses of all ages but is most prevalent in pregnant or lactating mares. The influence of cold was discounted. The early symptoms (loss of appetite, slight colic, yellowish conjunctiva, rapid pulse) may escape notice until swellings appear on the rump and the urine becomes dark coloured. These swellings usually subside after 48 hours but others appear on the head and mastication is affected. Death may then supervene in 36 to 48 hours, usually on the 4th to 8th day after lesions appear, but some cases may survive 12 days. Gross *post-mortem* lesions are not characteristic but the kidneys may be much enlarged and degeneration of affected muscles is histologically apparent.

Treatment was tried with numerous medicaments without success although camphor appeared to exercise a favourable influence. Intravenous injection of sodium hyposulphite appeared promising (four recoveries out of six cases) and is being tested further.—H. H. Green.

Hill, W. H., King, H. M., & Laird, D. G. (1933). **Some Further Studies on the Etiology of Bovine *Haematuria vesicalis* (Redwater) in British Columbia.** —*Sci. Agric.* **13.** 545-560. 9 tables. [63 refs.]

This paper, besides containing a good review of the literature on the condition, presents some analytical data on the mineral constituents of soil, hay grasses, water and urine (from affected cattle) obtained from farms in British Columbia. In each case herbage from unaffected land was analysed for comparison. The average values between " normal " and " abnormal " material were very close, and no significant discovery with a direct bearing on aetiology was made. The soil was stated to be rather poor in quality, rather acid and poor in minerals, and the grasses rather low in mineral content [see, on the other hand, BULL, DICKINSON & DANN. — this *Bull.* **3.** 318 —, who found " affected " soil very fertile and not acid].

The authors consider that further work on this disease should be directed to the composition of urine, the bladder tissue, flesh and milk of diseased animals. —J. E.

—. (1933). **Causation and Treatment of Arthritis and Allied Conditions.**—*Brit. Med. J.* June 17th. 1033-1052. 3 tables. [38 refs.]

In this report of the British Medical Association Committee it is mentioned that certain forms of arthritis seen in animals are true osteo-arthritis ; suffraginitis is quoted as an example. Some constitutional factor appears to encourage bone formation under the slightest stimulus, such as strain or repeated minor injury. Osteo-arthritis in horses is often accompanied by peripheral interstitial neuritis. Treatments recommended in human beings include hot packs, cautery, exercise and massage, tenotomy and deep X-ray treatment. The remainder of the report deals with the aspects, diagnosis and treatment of rheumatoid arthritis, villous arthritis, spondylitis and fibrositis. Further research into the bacteriology, biochemistry and clinical symptoms is necessary to enable more satisfactory classification and treatment.—NORMAN HOLE.

ZWIJNENBERG, H. A. (1933). Endocarditis verrucosa bij het Rund. **[Endocarditis verrucosa in Cattle].**—*Tijdschr. Diergeneesk.* **60.** 234-239. 2 figs. [Summary in English : abst. from orig.]

It is supposed that there is some connection between liver distomatosis and endocarditis verrucosa ; with the efficient treatment of the first disease the latter has shown a remarkable decrease during recent years. In most cases *Corynebact. pyogenes* is found in the proliferations of the cardiac valves ; the bacillus may come from the pyogenic process that often arises from distomatosis of the liver. The affection mostly exists in the tricuspid valve ; pain is felt on pressure of the left half of the thorax. Two cases are described.—A. KLARENBEEK (UTRECHT).

CLARENBURG, A. (1933). Haemangioma cavernosum (cysticum) in de subcutis van een varken. **[A Cavernous Haemangioma in the Subcutis of a Pig].**—*Tijdschr. Diergeneesk.* **60.** 416-418. 1 fig. [Summaries in English, French and German : abst. from orig.]

Irregular cavities were found in the cutis and subcutis of a slaughtered pig ; they were filled with a serous or sanguineous fluid and partly with tissue. The cavities, lined by endothelial cells, appeared to have been formed by vascular dilatation, followed by thrombosis. The disease was diagnosed as cavernous haemangioma.—A. KLARENBEEK (UTRECHT).

MALKANI, P. G. (1933). **Etiology of Kumri. A Preliminary Note.**—*Ind. Vet. J.* **10.** 6-19. 7 figs. on 4 plates. [25 refs.] [Paper presented to the Indian Science Congress, 1933, Patna .

According to the author's investigations, kumri in horses appears to be due to *Schistosoma indicum* Montgomery, 1906. This view is based on the *post-mortem* examination of two horses, the parasites having been found in the mesenteric blood, portal vein and liver. Support is also lent to the schistosomiasis theory by the favourable results obtained following treatment with antimony compounds. —Gwilym O. Davies.

Biely, J., Palmer, V. E., & Lerner, I. M. (1933). **Fowl Paralysis (Neurolymphomatosis Gallinarum) in Chicks under three Months of Age.**—*Canad. J. Res.* **8.** 305-311. 1 fig., 3 tables. [15 refs.]

In a batch of 244 chicks, 45 showed infection with fowl paralysis (confirmed by macroscopic nerve lesions on autopsy in 93 per cent. of cases) before reaching 90 days of age. The average age of infection was 64 days, and the earliest age 37 days. The chicks were hatched from eggs from a known infected flock. Half of the 244 chicks had been inoculated with fowl paralysis material during the first week. Of the 45 which became affected with the disease only 20 had been inoculated [thus this is no evidence of successful transmission of the disease by inoculation].—Norman Hole.

Delaplane, J. P., Stuart, H. O., & Bunyea, H. (1933). **A Preliminary Report of an apparently New Respiratory Disease of Chickens.**—*J. Amer. Vet. Med. Ass.* **82.** 772-774. 1 fig.

This disease was observed almost simultaneously in June, 1932, on several isolated poultry farms in Rhode Island. Affected birds showed an exudative rhinitis and sinusitis, together with inflammatory changes in the eye leading to profuse lacrymation and photophobia. Rapid emaciation was followed by death. The disease spread through the flocks very rapidly, the death rate being high. Upon autopsy no other pathological changes were found, the larynx, trachea and bronchi not being appreciably or consistently involved.

Up to the present the causal agent remains undetermined, no pathogenic organisms capable of reproducing the disease having been isolated. The authors have also failed to demonstrate the presence of a filtrable virus. They have, however, shown that it is inoculable and demonstrated by cross-immunity tests that the disease bears no relation to laryngotracheitis.—Gwilym O. Davies.

Thomas, A. D., & Brown, M. H. V. (1933). **Is Powdered Glass "Poisonous" to Animals?**—*J. S. Afric. Vet. Med. Ass.* **4.** 149-153. 2 tables. [2 refs.]

In view of the belief that powdered glass is used for the malicious destruction of dogs in South Africa, the author fed powdered glass and glass crushed and graded in particles of 0·2 mm. to 6·8 mm. to seven dogs. Practically all the glass was voided in 96 hours and no ill effects were observed.—R. G. Linton.

Clark, R. (1933). **Observations on Sweating Sickness in Northern Zululand.**—*J. S. Afric. Vet. Med. Ass.* **4.** 10-20. 2 figs., 3 tables, 1 graph, 3 maps. [2 refs.]

This is a clinical account of "sweating sickness" based on two years experience. The disease, which was usually seen in calves, was characterized by sensible perspiration, with ulceration and the formation of a pseudo-diphtheritic membrane on the mucous membrane of the mouth and in some cases of the nostrils and vagina. Severe conjunctivitis was common and was frequently followed by keratitis and opacity. In the later stages the hair fell out, the dermis-hardened areas of skin becoming necrosed especially at the extremities. The disease usually lasts

about eight days, but it may be either acute or chronic and can be either sporadic or enzootic. Nothing is known of its aetiology or method of transmission. As many calves die of inanition, it is suggested that calves unable to suckle should be pail-fed, as it is stated that this lowers the mortality. The paper is concluded by a discussion of the factors contributing towards morbidity in the area and notes on the distribution of the complaint.—Edward F. Peck.

Schebitz. (1933). Erkrankungen der Haustiere im Gefolge von Mineral-Stoffwechselstörungen und ihre Bedeutung für den Praktiker. [**Diseases of Domestic Animals caused by Disturbance of Mineral Metabolism and their Significance in Practice**].—*Deuts. tierärztl. Wschr.* **41.** 131-136. [23 refs.]

The author states his views on the causation of milk fever and grass tetany in cattle. He believes that, in grass tetany, stall feeding with lack of calcium is the primary cause, calcium-depleted pasture contributing, and that sunlight is the final causal agent, acting by hastening calcium metabolism by its activation of vitamin D in the body.

The author gives some case records in illustration and states that calcium, magnesium and ephedralin therapy give good results in treatment. This is also said to be useful in cases of *ante-partum* and *post-partum* paralysis.

—F. W. Müller (Berlin).

van der Graaf, J. (1933). Kopziekte-behandeling. [**Treatment of Grass Tetany**].—*Tijdschr. Diergeneesk.* **60.** 252-253.

The technique of the intravenous calcium-magnesium injection is described. Infusion with a simple apparatus provided with long tubes so that it can be held high, is preferred ; if the needle is well placed in the vein, a helper can control the infusion and the veterinary surgeon can carefully check the heart beats. 80 g. calcium chloride and 8 g. magnesium chloride are injected. Very few animals react directly with an irregular pulse, which proves that the injection of this amount is not dangerous.—A. Klarenbeek (Utrecht).

I. Svanberg, O. (1932). Om Afosforotiska Bristsjukdomar bland boskapen i Småland : Framst coxiter hos nöt (Mjölkhålta). [**Phosphorus Deficiency Diseases of Cattle in Smaland, chiefly Coxitis or "Milk Lameness"**].—*Kungl. Landbruksakad. Handl. O. Tidskr.* **71.** 41-84. 7 tables. [20 refs.] [Summary in German : abst. from orig.]

II. Svanberg, O. (1932). Om Afosforotiska Bristsjukdomor bland boskapen i Sverige. II. Avmagrin med sleksot i Dalarna m. fl. lands-kap ("Skravelsjuka"). [**Phosphorus Deficiency Diseases of Cattle in Sweden. Inanition with Pica in Dalarna and other Provinces**].—*Ibid.* 660-720. 21 tables. [42 refs.] [Summary in German : abst. from orig.]

I. In the Swedish province, Småland, diseases of the type of osteomalacia and rickets are fairly common in cattle. An enzootic coxitis deformans affects the best milk cows. This begins with asymmetry of the hips and peculiar gait in otherwise well-nourished cows of good milk yield, becomes progressively worse and ends with defective appetite and inanition. The disease is popularly known as "mjölkhålta" ["milk lameness"]. The affection may be unilateral or bilateral and the stifle joints may also be affected. On slaughter, cavities on the surfaces of the joints, and calcareous metastases in the connective tissue, may be shown. "Lecksucht" or depraved appetite is common. Defective growth and deficiency symptoms may also be shown in young animals, particularly in foals.

Hay from affected areas was found to be low in phosphorus but adequate in calcium. Cases could occur in stall feeding when phosphorus-poor hay was used but the majority of cases occurred at pasture during the lactation drain following calving.

The author compares his observations with those from other parts of the world, particularly those from South Africa [this *Bull.* **2.** 168].

II. Discusses aphosphorosis of cattle in Sweden, particularly the forms associated with malnutrition and depraved appetite. The malnutrition may proceed to extreme cachexia in which the animals are slaughtered to anticipate death from inanition. Cows of good milk yield are most affected but in some districts calves and steers also suffer to such an extent that cattle rearing becomes impossible. The author uses the term " aphosphorotic indigestion " and distinguishes two types which shade into one another—one curable by feeding molasses and the other " sugar resistant."

The soil of the areas concerned is poor in phosphorus and the vegetation is characterized by dearth of leguminous plants, low protein, and phosphoric oxide content of about 0·25 per cent. Feeding 30 to 50 g. of sodium phosphate (40 per cent. phosphoric oxide) per head per day to the cattle is often sufficient to correct deficiencies and encourage food consumption.

The suggested measures for improving the cattle industry include phosphatic manuring of the pasture, fostering the leguminous herbage, early harvesting of hay, supplementary winter feeding and the introduction of fresh stock. In building up a new herd, the suitability of breeds for the district must be considered and no good purpose is served by introducing high grade animals capable of yielding more milk than the pasture can produce. The author advises introduction of stock from areas not too dissimilar in pastoral type and building up a better quality of stock in the poor districts by improving the general agriculture and feeding supplementary rations.—H. H. Green.

Fraser, A. H. H., Godden, W., & Thomson, W. (1933). **The Effect of a Calcium Deficient Diet on Pregnant Ewes.**—*Vet. J.* **89.** 408-411. [5 refs.]

In an experiment involving four ewes on a calcium-low diet (1·58 g. CaO and 8·6 g. P_2O_5 daily) in comparison with four ewes on the same ration supplemented with calcium carbonate and lactate (bringing the daily intake of CaO to 11 g. and P_2O_5 to 10 g.) the former showed lowering of blood Ca, inability to complete normal pregnancy, and death with symptoms of preparturient paralysis. Case histories are supplied.

Since the experimental conditions involved confinement, anorexia and possible acidosis, it is not suggested that the observed " pregnancy disease " syndrome is generally due to Ca deficiency, but merely that such deficiency may precipitate an outbreak which would otherwise not have occurred.—H. H. Green.

Leslie, A. (1933). **Pregnancy Disease of Ewes in Canterbury, New Zealand.**—*Austral. Vet. J.* **9.** 9-14. [9 refs.]

Field observations on some 30 farms where pregnancy disease occurred showed that the disease is always preceded by loss of condition due to poor nutrition, that old ewes are more susceptible than ewes under four years of age and that a large proportion of cases occur in ewes carrying twins. Two extensive outbreaks were seen following long train journeys. Active purgation and a change of diet to succulent green feed after the prodromal symptoms of excitement appear has given excellent results in preventing the disease. About 50 per cent. of early cases treated with subcutaneous injections of dextrose solution recovered, but no

response was obtained from calcium treatment. Exercise and reduced diet were valueless in preventing further development of the disease in a flock.

The results of a controlled experiment supported the claim that undernutrition and consequent loss of weight in ewes approaching lambing is an important factor in the aetiology of the disease.

As a result of these observations, some 3,000 ewes, among which the incidence of the disease during 1930 was 7·4 per cent., were given a flush of feed during the last six weeks of gestation in 1931. The incidence following this treatment was only 0·6 per cent.—W. I. B. Beveridge.

I. Philp, T. (1933). **Disease of King Island Stock Arising from Mineral Deficiency.**—*Austral. Vet. J.* **9.** 42-53. 8 figs., 1 table.

II. —. (1933). **The Investigation of "Coast Disease."**—*J. Sci. & Indust. Res. Australia.* **6.** 67.

I. The topography of King Island, which lies midway between Tasmania and Australia, is described and soil analyses are given. Cattle when run on certain areas for more than two months develop a condition known locally as "coast disease." Previous investigations showed that the condition had certain resemblances to "bush sickness" in New Zealand and was prevented to some extent by administration of iron salts. It has now been shown, however, that phosphorus deficiency is the most important factor and cattle will develop normally on "unsound" country when bone meal is made available. Some soil analyses show an absolute phosphorus deficiency while others show a high calcium content which appears to be the cause of a relative phosphorus deficiency. It remains to be shown whether an iron deficiency is also present. The symptoms of aphosphorosis are believed to be more marked on King Island than anywhere else in Australia, and this is supported by the fact that not only cattle, but also horses, sheep and pigs are severely affected.

II. This is an outline of proposed investigations on "coast disease" affecting sheep on certain tracts of calcareous country in the coastal areas of South Australia. It is thought that the term includes a variety of maladies.—W. I. B. Beveridge.

Wolbach, S. B., & Howe, P. R. (1933). **The Incisor Teeth of Albino Rats and Guinea Pigs in Vitamin A Deficiency and Repair.**—*Amer. J. Path.* **9.** 275-293. 26 figs. on 13 plates, 3 tables. [13 refs.]

Observations were made upon 20 rats and 18 guinea pigs, to show the effects upon the teeth of vitamin A deficiency for periods of 61 to 299 days. Sixteen rats, after deprivation of vitamin A, were subsequently given this drug for periods of 5 to 43 days, and then killed and examined to observe the process of recovery. Sections of skulls decalcified with 5 per cent. nitric acid in alcohol were used for the histological preparations. The first effects of deficiency are upon the enamel organ, atrophy being followed by metaplasia and calcification. Next follows atrophy of the odontoblasts, those on the labial side of the tooth being the most persistent. There, in apposition to the enamel organ, gross deformities develop from absence of dentine formation. It is concluded that the odontoblasts are influenced throughout life by the enamel organ. During subsequent recovery following the administration of vitamin A, the restoration of the enamel organs occurs first and shortly afterwards the odontoblasts in this region recover. By the seventh day the latter may be functioning normally and calcification of the predentine occurs rapidly.

The odontoblast recovery was very similar to the sequences seen in bone repair from fibroblast to osteoblast. Slight differences were observed between

the rat and the guinea pig. It is considered possible that defective enamel formation, ossification of the pulp and denticle and cementicle formation in human beings are consequences of vitamin A deficiency.—HENRY DRYERRE.

PUBLIC HEALTH.

GAIGER, S. H., & DAVIES, G. O. (1933). **The Occurrence of Acid-Fast Bacteria, other than** *Mycobacterium tuberculosis*, **in Milk.**—*Vet. Rec.* **13.** 876-882. 1 table.

The authors discuss the claim of ALBISTON [(1930). *Austral. Vet. J.* **6.** 123.] that he found saprophytic acid-fast bacilli in 9·3 per cent. of milk samples obtained from 1,300 dairy farms in Australia. The diagnosis was based on the lesions produced by these organisms in guinea pigs. In 26 per cent. of 213 samples, ALBISTON detected saprophytic acid-fast organisms by microscopic examination of the centrifuge deposit.

Gaiger and Davies are of the opinion, based on a considerable experience of biological examination of direct milk samples in this country, that saprophytic acid-fast bacilli are not a factor that need be considered.

Out of a large number of centrifuge sediments examined they have not met with any acid-fast organisms the identity of which was doubtful. In thick parts of smears, imperfectly decolourized, diphtheroid organisms which retained the fuchsin stain have been observed, but these were readily distinguished on morphological grounds from tubercle bacilli. Gaiger and Davies have, in view of ALBISTON'S claim, paid special attention to inoculated guinea pigs showing restricted lesions on autopsy and in these cases material was subinoculated into another guinea pig. It was found necessary to adopt this procedure in nine instances and in eight of these the lesions induced in the second guinea pigs confirmed the original diagnosis of tuberculosis.

The two guinea pigs inoculated with the remaining milk sample died on the 7th and 15th day respectively after inoculation and pus from the site of inoculation in both cases showed on examination acid-fast bacilli indistinguishable from tubercle bacilli. Further investigation failed to confirm a diagnosis of tuberculosis and the authors believe that this was a chance infection of the milk with a saprophytic acid-fast organism. Since this occurrence 4,400 samples of milk have been examined and no other instance of localized lesions containing acid-fast organisms have been encountered. On these grounds the authors are of the opinion that the type of infection reported by ALBISTON in Australia does not occur in this country.—T. M. DOYLE.

TORRANCE, H. L. (1933). **The Inadequacy of "Bulk" Sampling as a Means of Protecting the Public from the Dangers of Tubercle Infection in Milk.**—*Vet. J.* **89.** 179-183.

The article deals with the methods usually adopted by local authorities in collecting milk samples for examination for the presence of tubercle bacilli, the laboratory aspect of the biological test not being discussed.

The author indicates the difficulties and errors which may arise and states :—"In the collection of bulk samples it is assumed that if a cow on the farm where the milk is produced is passing tubercle bacilli in her milk, their presence in the churn will be detected by means of the biological test ; and so it would if all cases were just as simple as the illustration, but all kinds of difficulties and complications arise in practice which detract from the reliability of the procedure as an adequate means of protecting the public."

Amongst the factors liable to detract from the usefulness of the system he mentions :—(1) the milk of the whole herd is not always included ; (2) churns may be mixed and so be wrongly labelled ; (3) milk from several producers may be mixed ; (4) milk may be pasteurized ; (5) many of the inoculated guinea pigs may die prematurely, especially in summer ; (6) the milk examination gives no indication of the condition of any cows on the farm temporarily dry and (7) where milk is collected from the farms of several small producers, the same measures may be used and so contamination of previously clean samples may occur. These dangers are discussed at some length.

The author points out that the law as a protection to the town consumers against milk produced outside their own areas is inadequate and should be remedied. The weaknesses of bulk sampling tend to show up the benefits to be derived from regular clinical veterinary inspection of herds but, as the writer points out, such inspection is carried out in so few districts that it can only afford a partial protection to a very limited number of towns.—D. S. Rabagliati.

Mattick, A. T. R., Hiscox, E. R., & Christian, M. I. (1933). **Biennial Reviews of the Progress of Dairy Science. Section B. Bacteriology and Mycology Applied to Dairying.**—*J. Dairy Res.* **4.** 285-311. [211 refs.]

Owing to the fact that milk of good hygienic quality now commands a higher price than low-grade milk, increased attention is being paid to the reliability of milk-testing methods. The difficulties associated with the plate count, the only method for enumerating small numbers of bacteria in milk, are discussed, and attention is drawn to the requirements of a satisfactory culture medium, simplicity, cheapness and reproducibility. Burri's smear method, Breed's direct counting method and the methylene blue reductase test are discussed in the light of recent work connected with them. A comprehensive review is given of the saprophytic flora of milk and milk products including coliform organisms, organisms and mechanisms producing faults, such as milk taints, and the growth of lactic acid bacteria. Other sections of the literature review include the pasteurization of milk, and butter and cheese making. A valuable comprehensive review.

—R. G. Linton.

Anderson, E. B., & Meanwell, L. J. (1933). **Studies in the Bacteriology of Low-Temperature Pasteurisation. Part I. The Significance of Heat-Resisting Organisms in Raw Milk Supplies.**—*J. Dairy Res.* **4.** 213-225. 12 tables. [15 refs.]

A lack of constant relationship between the numbers of colonies reported on the different dilution plates when standard agar was used has been noted. The discrepancies disappeared when 0·5 per cent. milk was added to the agar. The presence of thermophilic organisms is another cause of discrepancy. It was found that, if milk containing heat-resisting organisms remains uncooled for more than two hours, rapid multiplication of the heat-resisting organisms may take place. Adequate cooling of milk on the farm should, therefore, be insisted on. The importance of utensil sterilization is stressed as heat-resisting organisms frequently originate from the surfaces of unsterilized farm utensils. When utensils are not properly sterilized, more heat-resisting organisms are found in machine-produced milk than in hand-produced milk.—R. G. Linton.

Glässer. (1933). Jahresbericht über veterinär-bakteriologische Milchuntersuchungen im veterinären Provinzial-Untersuchungsamte Hannover im Jahre 1932. [**Annual Report on the Veterinary Bacteriological Examination of**

Milk in the Provincial Research Institute, Hanover, 1932].—*Deuts. tierärztl. Wschr.* **41.** 269-271 and 301-303. [1 ref.]

The author reviews the working of the new Milk Act in respect to (1) loose, raw milk ; (2) pasteurized milk and (3) controlled milk, and discusses the difficulties experienced in carrying the law into effect. The number of samples examined was 232. Of the raw milk samples, 8 were found to contain streptococci, 4 to contain leucocytes and 20 *Br. abortus*. In regard to *Br. abortus* infection, Glässer is of opinion that, as 15 to 20 per cent. of the farms from which Hanover gets its milk are infected, eradication will be a lengthy process. Only 12 cases of Bang's disease in man were reported in Hanover in 1932 but, although in no case was there any direct proof of infection from milk yet, as some of the patients worked among cows, the infection might quite well have been of animal origin. Glässer hopes by the use of improved methods of examination to follow up this question more closely next year.—F. Bullock.

Tucker, H. H. (1932). **Manual for Milk Testers in New Jersey.**—*New Jersey Agric. Expt. Sta. Bull.* No. 539. pp. 31. 17 figs. [5 refs.]

This bulletin is designed as a handbook for milk testers and in it the methods of sampling and testing milk cream and ice-cream for butter fat, and the testing of milk for solids and acidity, are brought up to date. Particular attention is paid to the Babcock and Gerber tests, and the use of lactometers for determining the solid content of milk. The law relating to dairy inspection in New Jersey is also given.—Gwilym O. Davies.

I. Stirling, J. D., & Blackwood, J. H. (1933). **The Nutritive Properties of Milk in Relation to Pasteurization. A Review of Existing Knowledge.**—*Hannah Dairy Res. Inst. Bull.* No. 5. pp. 80. 8 tables. [188 refs.]

II. —. (1933). **Milk and Pasteurization.**—*Brit. Med. J.* May 6th. 792-793. [1 ref.]

III. Savage, W. G. (1933). **The Effect of Pasteurisation Upon the Nutritive Properties of Milk.**—*Lancet.* **224.** 429-433. 5 tables.

I. This report is a review of evidence, not a summary of opinions, the experiments being in relation to the "holder" method of pasteurization. Briefly, these experiments show that after pasteurization cream forms more slowly ; about 5 per cent. of the albumin is coagulated ; some slight alterations in the calcium and phosphate occur ; the action of rennin on the calcium caseinate is slightly affected and about 50 per cent. of the vitamin C content is usually lost. It was suggested that pasteurization had some deleterious effect upon the enzymes, antibodies and lactic acid bacteria of milk, but there is no evidence that milk enzymes have any food value for human beings. Further, as regards lactic acid, pasteurized milk sours in the same way as good quality fresh milk. Scurvy is the only disease resulting from the use of such milk by infants, vitamin C is not abundant in fresh milk and pasteurization does not affect it to any degree. Vitamin D in milk is so very sparse that its presence does not affect the growth of bone. There is ample evidence to show that there is no decreased food value as a result of pasteurization and, in those few instances where some ingredients of the milk are impaired by pasteurization, these can be replaced by other foods.

II. This is an annotation of the above.

III. The official definition of pasteurization is that milk is heated to 145°F. and held between 145° and 150°F. for 30 minutes, after which it is rapidly cooled.

The changes produced by pasteurization are :—(1) the cream rises more

slowly ; (2) milk proteins are not altered ; (3) there is no change in the fat content and (4) lactose is not affected.

As regards the mineral constituents of milk, about 26 per cent. of diffusible calcium in cows' milk is reduced by pasteurization by about 6 per cent. Enzymes are not destroyed at a temperature of 150°F. ; peroxidase is definitely not destroyed. Assuming that enzymes may be destroyed, there is no evidence available that they are of importance in human dietetics.

Vitamin A is abundant in fresh milk and is not affected by pasteurization ; vitamins B_1 and B_2 are practically heat-resisting ; vitamins D and E resemble vitamin A in heat resistance ; vitamin C is the least resistent to heat, but on experiment only about 20 per cent. of it is destroyed and then only at a temperature exceeding that of normal pasteurization.

It is evident that some changes do occur on pasteurizing cows' milk. These changes may be detrimental to the calf, but do not affect the suitability of such milk as a food for man. The chemical composition of raw human, raw bovine, and pasteurized bovine milk shows that the changes caused by pasteurization, apart from lowering of the vitamin C content, are in the direction of making cows' milk a little less unlike human milk.

The results of animal feeding experiments are discussed. Rats fed on milk after prolonged boiling did not make satisfactory growth—Daniels and Loughlin (1920).

Orr, Crichton, Crichton, Haldane and Middleton [(1926). *Scot. J. Agric.* **9.** 377.] found that in pigs, when fresh cows' milk was given in conjunction with a ration of cereals, the rate of absorption of calcium, phosphorus and nitrogen rose rapidly, but this was depressed when pasteurized milk was substituted. Magee and Harvey [(1926). *Biochem. J.* **20.** 873 and 885.] showed that a young pig fed on a diet of cows' milk and cereals showed signs of rickets after 30 days, but after the addition of a soluble calcium salt to the diet the animal remained in a thriving condition for 60 days.

Calves receiving pasteurized milk were not in such a good condition as those getting pasteurized milk plus a calcium salt. One experiment showed, in fact, definite signs of malnutrition.

Experiments show how complicated is the problem of anaemia and faulty reproduction in the rat in relation to milk feeding. Rats do not thrive on cows' milk heated or otherwise.

In arriving at a conclusion it should be borne in mind that the diminution in the available calcium of the milk which pasteurization effects is likely to show itself by diminished growth.

It would appear to be wrong to apply the results of these experiments on animals to human beings, because the human infant needs much less calcium and phosphorus than are present even in pasteurized cows' milk. This is borne out by the composition of human milk.—F. W. Medlock.

Bongert, J. (1933). Gutachten über die Zwangspasteurisierung der Milch. **[Compulsory Pasteurization of Milk].**—*Tierärztl. Rdsch.* **39.** 205-208.

The author here considers the advantages and disadvantages of introducing compulsory pasteurization of milk in the free town of Danzig. He is not in favour of it for the following reasons :—

The destruction by pasteurization of organisms injurious to mankind is uncertain ; tuberculosis in swine kept at pasteurizing factories appears to be increasing and heating at 63° to 65°C. for 30 minutes does not kill with certainty *Mycobact. tuberculosis*, mastitis streptococci or typhoid and paratyphoid bacteria.

Double-walled pasteurizing apparatus is inefficient owing to the impossibility of obtaining a uniform temperature at all points.

Inefficiently pasteurized milk is also injurious in other ways—if improperly cooled, the milk becomes bitter and odorous. The vitamin content is said to be destroyed. Pasteurization by the holding method or the flash method is more efficient but more expensive.

The author is strongly in favour of obtaining pure milk by good hygiene at the farm. Tuberculosis-free calves should be reared on flash-pasteurized milk, the vitamins so lost being replaced by carrot juice and green vegetables.

—F. W. Müller (Berlin).

Kon, Phyllis M. (1933). **Coliform Organisms in Milk and Bovine Faeces.**—*J. Dairy Res.* **4.** 206-212. 5 tables. [15 refs.]

The customary bacteriological examination of milk includes a presumptive test for coliform organisms, without due regard to the actual bacteria which may be responsible for the production of the acid and gas produced in the test media—the bile salt lactose broth. As the presence of these coliform organisms is considered an index of faecal contamination, the author has isolated the organisms which give acid and gas in the test media and tested them further by use of the methyl red, Voges-Proskauer and indol tests and by Koser's citric acid test for the liquefaction of gelatin.

Milk and also bovine faeces have been examined and the relative numbers of *Bact. coli* and *Bact. aerogenes* determined by use of the above tests. A large proportion of those recovered from raw milk by direct plating proved to be *Bact. aerogenes*, with a number of intermediates. In samples of bovine faeces *Bact. coli* predominated, the proportion of *Bact. aerogenes* being very small. Should the author's results give a true indication of the relative numbers of *Bact. coli* and *Bact. aerogenes* found in milk, then it implies that many of the coliform organisms in such milk are derived, not from the faeces, but from external sources such as contaminated utensils and from food-stuffs.—R. Lovell.

Knowlton, M. (1933). **Milk-Borne Scarlet Fever in Thomaston [U.S.A.].**—*Connecticut Health Bull.* **47.** 32. 1 table.

An outbreak of scarlet fever consisting of 78 cases is recorded. Of these cases, exactly half had the usual scarlet fever rash, the remaining 39 had sore throats without a rash. All except one were among users of milk from one supply. The one case that did not use this milk was in contact with another patient and so is thought to have been infected by contact. No other cases of scarlet fever were reported locally during the period of the outbreak.

Pasteurization of the milk appears to have controlled the outbreak and it is concluded that the source of the disease was from the throats of those who handled the milk supply. Haemolytic streptococci giving similar reactions [the type of tests is not indicated] to those causing scarlet fever were isolated from the inflamed throats of the milk-handlers. Haemolytic streptococci were not isolated from the milk of two cows with mastitis in the herd.—R. Lovell.

Thompson, R. (1933). **The Isolation of *Brucella abortus* from Ice Cream.**—*Canad. Med. Ass. J.* **29.** 9-11. [Summary taken from *Bull. Hyg.* **8.** 769. Signed G. S. Wilson].

The authors examined a number of specimens of ice-cream, which were specially prepared from raw milk infected with *Br. abortus*, in order to ascertain how long this organism could remain alive. The ice-cream was kept at 30°F.,

and was plated out at intervals on gentian violet agar. In one sample it proved possible to demonstrate the presence of living *abortus* bacilli for one month after its preparation.

I. Riedel, W. (1932). Die Verwendung von Merck'schen Nährbodenpräparaten bei der Durchführung der bakteriologischen Fleischuntersuchung. [**The Use of Merck's Culture Medium Preparations, when carrying out the Bacteriological Examination of Meat**].—*Inaug. Diss. Berlin.* pp. 26. [13 refs.]

II. Endrejat, E. (1932). Vergleichende Untersuchungen von der Brauchbarkeit der Malachitgrün-, Brillantgrün- und Tetrathionatanreicherungsverfahren für die bakteriologische Fleischuntersuchung. [**Comparative Tests on the Usefulness of Malachite Green, Brilliant Green and Tetrathionate Enrichment Methods for Bacteriological Meat Inspection**].—*Münch. tierärztl. Wschr.* **83.** 266-269.

I. The culture media used in the experiments were prepared from Merck's prepared " Standard II " powder, which is easily made into culture media by mixing 35 g. of the powder with 1 litre of warm distilled water. Stained media are easily made by the addition of Merck's dye tablets to various media.

Merck's plain agar, Drigalski agar and endo-agar were tested for use in bacteriological meat inspection, the following bacteria, which were strains obtained from the Veterinary High School, Berlin, being grown :—*Bact. paratyphosum* B Schottmüller, *Bact. enteritidis* Breslau, *Bact. enteritidis* Gärtner, *Bact. coli*, etc. Tests were also made with 4 strains of Gärtner bacilli and 3 strains of *coli* obtained from the Stettin abattoir laboratory.

II. The author set out to test the relative values of Hoder's malachite green bile broth, Killian's brilliant green bile broth and Leon Müller's tetrathionate medium (modified by Pesch and Kortenhaus) for use in meat inspection. The following bacteria were used experimentally, both single and mixed cultures being prepared :—*Bact. enteritidis* Breslau, *Bact. enteritidis* Gärtner, *Bact. paratyphosum* B Schottmüller and *Bact. coli*. Endrejat arrived at the following conclusions :— In the mixed cultures a good enrichment was gained after 24 hours incubation on malachite green bile broth. The enriching power of the brilliant green medium was far weaker. The malachite green medium was a stronger check for *Bact. coli* : the tetrathionate medium proved best. After 3 hours incubation *Bact. coli* was strong, while the meat poisoners grew freely. A six hours incubation was sufficient. In the animal experiment *Bact. enteritidis* Breslau could be grown on all three media ; only the tetrathionate media suppressed *Bact. coli* almost totally. Only tetrathionate medium allowed undoubted Gärtner colonies to grow on mice excrements ; on both the other media they died. *Proteus vulgaris* could not be suppressed on any of the three media, but on a Drigalski plate with the addition of 0·1 per cent. carbolic acid, Breslau strains grew without being damaged while *P. vulgaris* was considerably checked.—W. von Düring (Berlin).

Huck, W., & Möller, J. (1933). Beitrag zur Verwendung des Stoffwechselnährbodens von Simmons in der bakteriologischen Fleischuntersuchung. [**Work upon the Application of Simmons' Synthetic Medium in Bacteriological Examination of Meat**].—*Zschr. Fleisch- u. Milchhyg.* **43.** 245-247. 2 tables. [5 refs.]

Simmons' medium is olive-green when set in a petri dish. The paratyphoid-enteritidis group of organisms turns it an intense blue, the *coli* group usually does

not change the colour, but the *aerogenes* type tends to turn the green slightly bluish. Bromthymol blue is the indicator used.

On this medium, organisms tend to grow rather slowly whilst small inocula may not develop at all. For this reason, it cannot replace the standard media for meat examination, but it is useful as an extra test.—E. J. Pullinger.

POISONS AND POISONING.

Rek, L. (1933). Jak zasílati orgány podeřzrelé z otravy k chemickému vysetření. [**How to subject Organs suspected of Poisoning for Chemical Examination**]. —*Zverol. Obzor.* **26.** 121-124. 1 table. [2 refs.]

In the majority of cases of suspected poisoning the best material for chemical analysis is stomach or intestinal contents, or, in the case of small animals, the entire organs. In addition, portions of liver, kidney, blood and urine ought to be taken and, if possible, sealed in separate containers. It is undesirable to add any preservative.

The author gives a brief statistical review of the research activities in chemical analysis of animal poisoning undertaken by the Chemical Institute of the Veterinary School in Brno during the years 1931 and 1932. The most common causes of poisoning were arsenic (19 per cent.) and strychnine (13·7 per cent.).

—E. Pribyl (Brno).

—. (1933). **Alleged Poisoning of Cattle by Sewage.**—*Vet. Rec.* **13.** 637-650 and 674-684.

Two farmers grazing dairy herds issued writs against a rural district council, alleging pollution of a stream by effluent from the Council's sewage farm and consequent damage to cattle grazing in meadows watered by the stream. They claimed damages and an injunction. Six veterinary surgeons gave evidence that in their opinion the condition of the cattle was due to sewage poisoning. Evidence for the defence, given by nine veterinary surgeons, was to the effect that human sewage could not poison cattle, though bovine sewage was dangerous, and that some of the cattle were undoubtedly suffering from Johne's disease. Minett submitted the results of experiments carried on for 13 months in which three cows had been given sewage from the works, both crude and diluted, as their only drink, and they had suffered no harm. In the Lower Court Mr. Justice Horridge gave judgment for the plaintiffs, granting damages and an injunction against the Council. On appeal, however, this decision was by a majority reversed, Lord Justice Scrutton stating that the onus was on the plaintiffs to prove beyond doubt that the sewage effluent could and did cause the damage, which they had not done. He accepted the evidence for the defence that the effluent from the sewage works could not damage cattle since there were no elements in it which could produce the conditions of ill-health exhibited by the cattle. The injunction was discharged with costs against the plaintiffs. [An abstract of a further communication on this subject will appear in our next issue].—F. Bullock.

I. Clough, G. W. (1933). **Poisoning of Animals by Cyanides Present in Some Industrial Effluents.**—*Vet. Rec.* **13.** 538.

II. Wendel, W. B. (1933). **Methylene Blue and Cyanide Poisoning.**—*J. Amer. Med. Ass.* **100.** 1054-1055.

I. Three cases of fatal poisoning by cyanide of cows and one of ducks from industrial effluents arising from electrical works, photographic materials, aeroplane

and wireless apparatus factories respectively are reported. The cases are of great medico-legal interest for out of six cows 0·001 grains of cyanide per lb. of rumen contents was found in one case only, and out of 12 ducks faint traces were discovered in the gizzard of one. Water taken from the stream soon after the death of the ducks showed cyanide (as HCN) 6 grains per gallon, after 24 hours 1 grain, and after 72 hours 0·3 grains respectively. The results emphasize the rapid loss of cyanide in exposed organs, and its speedy loss on aeration in a stream liable to intermittent pollution, so that unless sampling is made at once and care taken to preserve the samples from air, the analytical evidence may be negative.

II. This note summarizes our present knowledge of the protective role of methylene blue against cyanide poisoning, which depends upon the catalytic transformation of haemoglobin into methaemoglobin, which latter forms a stable compound with hydrocyanic acid. Sodium nitrite is stated to be more effective than methylene blue, whilst pyrogallol, pyrocatechol and phenylhydrazine have a similar effect. From the quantitative point of view the dosage against which protection is possible is limited by the extent of safe removal of functional haemoglobin from the circulation. It is thus held doubtful that methylene blue could successfully combat a dose of 2 g. of potassium cyanide in a human being.

—G. D. Lander.

Murnane, D. (1933). **Ragwort Poisoning in Cattle in Victoria.**—*J. Sci. & Indust. Res. Australia.* **6.** 108-110.

Although ragwort (*Senecio Jacobaea*) has been shown to be toxic for horses, cattle and sheep in New Zealand and for cattle in Nova Scotia, there have not hitherto been any authentic reports of the toxicity of the plant in Victoria, where it is present. Cattle have frequently been seen eating ragwort in a district in which it is plentiful; toxic symptoms and death often ensue. The principle symptoms are marked wasting and jaundice, followed by diarrhoea, persistent thirst and staggering gait. On *post-mortem* examination the liver shows some cirrhosis and the submucosa of the abomasum is extensively infiltrated, so that the wall is increased in thickness to two inches. The condition was reproduced in a feeding experiment, the subject, a young bull, dying after being fed exclusively on ragwort for six weeks.—W. I. B. Beveridge.

Slagsvold, L. (1933). Seneciosis. [**Seneciosis**].—*Norsk Vet.-tidsskr.* **45.** 329-339.

Senecio disease occurs in the low coastal districts of the south-western part of Norway, where *Senecio Jacobaea* [ragwort] is found as a very common weed. The disease has only been observed in cattle, in which it appears with a facies morbi that is especially characteristic. By means of feeding experiments with *Senecio Jacobaea*, typical disease was engendered in an ox, whilst two sheep, one goat and two guinea pigs were not affected through feeding. Cattle generally avoid green plants in the pastures in the summer and the danger of contracting disease is when the plant is mixed with the hay.—H. C. Bendixen (Copenhagen).

Grasset, E. (1933). **Concentrated African Antivenom Serum: Its Preparation, Standardization and Use in the Treatment of Snake-Bite.**—*S. Afric. Med. J.* **7.** 35-39. [10 refs.]

The details of preparation of the concentrated polyvalent antivenine, issued by the South African Medical Institute, have already been published [Grasset, E. (1932).—this *Bull.* **3.** 380.] and the present paper deals mainly with experiments on sheep, comparing concentrated and unconcentrated antivenine, the influence

of delay in treatment, of rate of diffusion of venom (as influenced by the application of a tourniquet) and of species sensitivity (as between man and animals) on the therapeutic dose. The combined properties of increased potency, wide polyvalency, rapidity in neutralizing venom, and superior keeping qualities ensure to the concentrated product greater prospects of success in the treatment of snake bite. —H. H. Green.

THERAPEUTICS.

Tutt, J. F. (1933). **The Treatment of Sterility in Cows with Wheat-Germ Oil (Vitamin E).**—*Vet. J.* **89.** 416-420. 1 table. [1 ref.]

This method of treatment was first described by Vogt-Moller and Bray [(1931). *Vet. J.* **87.** 165]. Tutt now presents a table recording the results of the treatment in 25 cows of which 17 subsequently became pregnant. It would appear, however, that in 21 cases treatment other than wheat-germ oil had been previously applied. Tutt points out that it is useless to apply this treatment when there is clear clinical evidence of those diseases generally recognized as causing sterility, and also in those cases where the after-effects of such diseases have left irreparable changes in the genital apparatus. The wheat-germ oil treatment was administered subsequent to the other treatments after oestrus had become normal and service had been carried out at the second normal heat. Injections were made deep into the gluteal muscles, at intervals of six to eight days. It is not denied that, in some cases which became pregnant, pregnancy may have followed as a result of the other treatment.—Ll. E. W. Bevan.

Ross, I. Clunies, & Graham, N. P. (1933). **A Parasitological Field Trial on "Gundowringa," New South Wales, 1932.**—*J. Sci. & Indust. Res. Australia.* **6.** 26-31. 3 tables.

Corriedale ewe lambs, grazed on improved pasture, both with and without anthelmintic treatment, and with and without rotation of pastures, at the rate of two and a half and three sheep per acre respectively, made very much greater average gains in live weight, and produced from $1\frac{3}{4}$ to $2\frac{1}{2}$ lb. more wool per head than sheep on natural pastures at the rate of one sheep per acre. The average gain in live weight was 14 lb. per head and per acre on natural pasture ; while on improved pasture, without rotation, it was 49 lb. per head and 122·5 lb. per acre, and on improved pasture, with rotation, it was 51 lb. per head and 153 lb. per acre. Sheep on natural pasture produced, on an average, 9 lb. 2 oz. of wool per head and per acre, while on improved pasture up to 11 lb. 13 oz. per head and 35 lb. per acre were produced. Sheep on improved pasture treated with carbon tetrachloride at monthly intervals did not show any increase in body weight compared with untreated sheep on similar pasture, but produced a greater weight of fleece per head. The effect of improved pastures on wool character was to produce a slight lowering in the spinning count, but such wool was estimated to give as high or higher percentage of clean scoured yield as that from natural pasture, and was of better staple length. On *post-mortem* examination at the end of the trial only light helminth infestation was found in any animal on improved pasture whether treated or untreated, but in sheep on natural pasture up to 800 adult *Haemonchus contortus* per sheep were found. Under conditions met with in the trial any increased risk of parasitic infestation on heavily stocked improved pastures is more than compensated for by the improved health of sheep, as shown by greatly ncreased wool and mutton production. Nevertheless, anthelmintic treatment of

sheep on improved pastures may lead to material increase in wool production, when compared with similar groups not so treated.—H. McL. Gordon.

I. Carougeau. (1932). Emploi de l'Anhydride Sulfureux dans le traitement de la Strongylose gastro-intestinale du mouton. [**The Use of Anhydrous Sulphuric Acid in Parasitic Gastritis of Sheep**].—*Bull. Soc. vét. prat. Paris.* **16.** 277-282.

II. Noirot, P. (1932). Valeur anthelmintique du tétrachlorure de carbone. [**The Value of Carbon Tetrachloride**].—*Thesis for Docteur vétérinaire, Lyons.* pp. 55. [39 refs.]

I. Carougeau expresses surprise that the recommendations of Plessy [(1926). *Bull. Soc. vét. prat. Paris.* **10.** 239 and 260.] have not been more generally followed. Plessy recommended the substitution of a solution of 2·5 to 3 kg. of anhydrous sulphuric acid in 1,000 l. of water for the drinking water allowed to the flock. Carougeau has tried this treatment and finds that after two or three days the sheep will drink the solution readily with the result that the parasitic worms are expelled and even in those instances where the disease has reached an advanced stage recovery may take place.

II. This thesis gives a brief account of the anthelmintic uses of carbon tetrachloride, particularly for the control of fascioliasis. [Where carbon tetrachloride poisoning is apt to occur it would be advisable to proceed with greater caution than recommended by this author : although it is true that this drug is valueless for parasitic gastritis caused by the smaller trichostrongyles, its efficacy where the disease is caused by *Haemonchus contortus* is thoroughly established]. —E. L. Taylor.

Wright, W. H., Bozicevich, J., Underwood, P. C., & Schaffer, J. M. (1933). **N-Butylidene Chloride, a New Anthelmintic.**—*Vet. Med.* **28.** 52-64. 4 tables. [15 refs.]

Records tests to determine the anthelmintic value of *n*-butylidene chloride, a chlorinated hydrocarbon ($CH_3.CH_2.CH_2.CHCl_2$) with a solubility in water (1 : 2,000) conducive to high efficacy.

Administered to dogs at the rate of 0·3 c.c. per kg. body weight the new anthelmintic showed an aggregate efficiency of 96·5 per cent. against ascarids, 100 per cent. against hookworms and 8 per cent. against whipworms. The same dosage rate was efficient for cats. For horses the drug has a safety factor 14 times the therapeutic dose of 0·2 c.c. per kg. and is effective against *Strongylus* spp., *Poteriostomum* spp. and cylicostomes. Even 0·1 c.c. per kg. was 100 per cent. effective for removal of *Oesophagodontus robustus* and *Oxyuris equi*. Critical tests on two calves were unsatisfactory because of the difficulty of delivering the anthelmintic into the abomasum but clinical tests gave good results and stopped losses in a herd of calves dying of parasitism. With adult chickens, doses of 2 c.c. or more removed all specimens of *Ascaridia* but were not generally effective against *Heterakis gallinae*.

Most of the animals showed no gross lesions after administration of the drug. Histological changes in the kidney varied from passive congestion to acute nephrosis. The liver showed varying degrees of cloudy swelling with or without fatty degeneration, but never the acute central necrosis which frequently follows administration of carbon tetrachloride.—H. H. Green.

Colin, F. (1932). Contribution à l'étude de l'ergostérol irradié et à son emploi dans le traitement de la septicémie des nouveaux-nés et des diarrhées du

jeune âge. [**Irradiated Ergosterol in the Treatment of Septicaemia in the New-Born and Diarrhoea of Young Animals**].—*Thesis for Docteur vétérinaire, Lyons.*

From 12 series of observations, covering a considerable number and variety of clinical cases of septicaemic infections of calves and young pigs (umbilical and digestive tracts) the author concludes that irradiated ergosterol has curative and preventive value as anti-infective agent. In two of the observations, one on 10 sows with 110 suckling pigs and the other on 9 sows with 94, diarrhoea was controlled in the litters by administering irradiated ergosterol to the mothers.—H. H. Green.

Berndt, C. (1933). Valvanol und Antisepsis.—Betrachtungen aus der Praxis. [**Valvanol and Antisepsis.—Practical Considerations**].—*Deuts. tierärztl. Wschr.* **41.** 405.

The author speaks well of the efficiency as a disinfectant and antiseptic of valvanol (chlorinated phenols in alcoholic soap solution). It is said to be very valuable in the disinfection of skin in surgery and for the treatment of wounds. —J. E.

I. Wolff, W. A., Riegel, Cecilia, & Fry, Edith G. (1933). **The Excretion of Morphine by Normal and Tolerant Dogs.**—*J. Pharmacol. & Exp. Therap.* **47.** 391-410. 1 fig., 5 tables. [26 refs.]

II. Schmidt, C. F., & Livingston, A. E. (1933). **The Action of Morphine on the Mammalian Circulation.**—*Ibid.* 411-441. 12 figs., 1 table. [44 refs.]

III. Schmidt, C. F., & Livingston, A. E. (1933). **The Relation of Dosage to the Development of Tolerance to Morphine in Dogs.**—*Ibid.* 443-471. 3 figs., 6 tables. [16 refs.]

IV. Schmidt, C. F., & Livingston, A. E. (1933). **A Note Concerning the Actions of Pseudomorphine.**—*Ibid.* 473-485. 3 figs. [11 refs.]

These four papers describe the results of work carried out on the physiological and chemical bases of addiction to morphine.

I. The observations of the investigators suggest that there is no obvious relationship between the power of the body to destroy morphine and tolerance to the drug. The difference of excretion by normal and tolerant dogs is insignificant as, on the average, normal dogs excrete 20 per cent. and tolerant dogs 17 per cent. of the morphine given. The normal dog was found capable of destroying large amounts of morphine.

II. From the results of their work the investigators concluded that the tolerance to morphine on the part of the circulation did not extend the heart. Injection of morphine in normal animals causes a marked fall in blood pressure; after subcutaneous injection the fall is less marked than after intravenous injection unless very large doses are employed. The fall in blood pressure is shown to be due to dilatation of the peripheral vessels by direct action on their walls. Chronically poisoned tolerant dogs are resistant to this depressor effect. Tolerance of the circulation is rapidly brought about by large amounts of the drug if the animal is protected against the shock of such large injections.

It is suggested that the ability to become tolerant to high concentrations is common to the vaso-motor and respiratory centres as well as to the cells of the vessel wall.

III. Evidence is produced that cerebral cells normally depressed by morphine are rendered resistant as the result of previous exposure to high concentrations of the drug.

Fairly large doses rapidly produce tolerance, but with moderate doses

tolerance is only very slowly produced. The general impression that tolerance is rapidly acquired to small daily doses is shown, as far as the dog is concerned, to be incorrect. It is emphasized that tolerance is not due to increased destruction of the drug. The change in the cells which takes place when a dog is rendered tolerant persists only as long as a certain concentration of morphine is maintained.

IV. Pseudomorphine is the first oxidation product of morphine but, with one exception, workers have failed to recover pseudomorphine from animals dosed with morphine.

Pseudomorphine has no narcotic effects upon the central nervous system. It produces, if injected intravenously, vaso-dilator effects similar to, but more intense than, those produced by morphine. Animals tolerant to the circulatory effects of morphine are resistant to those of pseudomorphine and *vice versa*. It is shown, however, that pseudomorphine has no connection with the development of tolerance to morphine.—Geo. F. Boddie.

Winkel, A. (1933). Vergelijkend onderzoek van eenige ontsmettingsmiddelen ten behoeve van de bestrijding van het mond- en klauwzeer. [**Comparative Researeh on Some Disinfectants for destroying the Virus of Foot and Mouth Disease**].—*Tijdschr. Diergeneesk.* **60.** 404-410 and 458-467. 14 tables. [Summaries in English, French and German : abst. from orig.]

In 1927, Oblitsky and Boër observed the strong action of sodium hydrate on foot and mouth disease virus. Trautwein and Reppin confirmed this action on fluid virus and on virus in the vesicle wall tissue. Winkel experimented with the sensitivity of the virus of foot and mouth disease to changes in the pH of the medium. He carried out extensive research work on the action of different concentrations in sodium hydrate and sulphuric acid and the following materials were used :—pig lymph ; vesicle wall tissue from pigs and cattle ; infected sputum ; fresh excreta of cattle and manure of various alkaline reactions, in which vesicle wall tissue was immersed, and finally on the action of sulphuric acid on different organic and inorganic material. At the same time, research carried out proved that 5 per cent. creoline is not a disinfectant for the virus of foot and mouth disease.

Fluid virus was killed in 5 to 40 seconds by 2 and 1 per cent. sodium hydrate ; 0·1 per cent. of this solution killed it in 30 to 40 minutes. Sulphuric acid in similar concentrations was less active ; it took respectively 10 to 40 minutes and 5 to 6 hours.

Vesicle wall tissue virus was destroyed much more quickly by sulphuric acid than by caustic soda. It was killed by 2 per cent. sodium hydrate in 10 to 15 minutes and by 1 per cent. sodium hydrate in 40 to 50 minutes ; 0·1 per cent. sodium hydrate is effective in 12 to 24 hours. 2 per cent. sulphuric acid is lethal in 1 to 2 minutes.

Vesicle wall tissue virus of pigs in excreta is destroyed 40 times more quickly by sulphuric acid than by caustic soda, 1 per cent. being lethal in 15 to 20 minutes and 2 per cent. in 2 to 3 minutes. The time required to kill the virus by similar concentrations of sodium hydrate is 1 to 2 hours and 12 to 15 hours respectively. At a concentration at which sodium hydrate is inactive (0·6 to 0·4 per cent.), the acid solution still destroys virus. The action of sulphuric acid on excreta is much stronger than that of formalin, sodium hydrate or lime. For practical disinfection, a 2·5 per cent. sulphuric acid is recommended. It can kill vesicle wall tissue virus in manure in 30 to 40 minutes. The same concentration of sodium hydrate takes 5 to 6 hours.

Organic vegetable matter inactivates sulphuric acid, but as long as an active percentage of 0·3 is retained, the solution remains sufficiently effective.

—A. Klarenbeek (Utrecht).

PHYSIOLOGY.

Popow, N. A., Kudrjavcew, A. A., & Krasovsky, W. K. (1933). Zur Frage der Innervation und Pharmakologie des Magens der Wiederkäuer. [**Innervation and Pharmacology of the Ruminant Stomach**].—*Arch. Tierernährung u. Tierzucht.* **9.** 243-252. [13 refs.]

The authors' technique consisted in bringing the vagus to the surface of the neck and stitching skin around it to form a protected external cable [diagram given] so that when the wound healed the nerve was available for electrical stimulation through its skin cover and for external jacketing by a cooling apparatus. This procedure gives a sheep which can be used for a lengthy series of experiments. Observations on movements of stomach compartments were made either by X-ray examination or by inserting recording balloons through previously prepared abomasal fistulae.

The results were :—(a) stimulation of the skin-covered vagus produced contractions of the omasum easily visible on a Roentgen screen ; (b) prolonged stimulation caused tetanic contraction ; (c) excluding both nerves by sufficient cooling (ice-water circulation over the skin sheath) stopped spontaneous movements of the omasum ; (d) stimulation of the central end of the blocked vagus caused no contraction ; (e) morphine (subcutaneous injection) did not eliminate the response of the omasum to electrical stimulation but pilocarpin did ; (f) stimulation of the peripheral end of the vagus also had a distinct influence on the contractions of the abomasum, generally in the direction of inhibition (sometimes the reverse) and (g) the effect of vagus stimulation depended considerably upon the functioning state of the abomasum.—H. H. Green.

Trautmann, A. (1933). Beiträge zur Physiologie des Wiederkäuermagens. VI. Mitteilung. Ueber die Resorption in Wiederkäuermagen. [**Physiology of the Ruminant Stomach. Part 6. Absorption from the Ruminant Stomach**].—*Arch. Tierernährung u. Tierzucht.* **9.** 178-193. 1 fig. [30 refs.]

Discusses the histology of the epithelium of the stomach system of ruminants, and considers structural peculiarities which suggest permeability to water and water-soluble substances. Working on sheep and goats fistulae were inserted into the various compartments, food material was washed out with warm water and solutions of drugs of known physiological action were then introduced into folds of epithelium, taking various precautions to avoid undue dilutions with swallowed saliva and prevent passage of the drug from one compartment to another. The rate of parotid secretion following pilocarpin, dilatation of the pupils and diminution of salivary flow with atropin, and the colouration of the urine after pyridium, were noted. The drug solutions were coloured and introduced in small amount so that the staining of the mucosa served to indicate the absorption area at *post mortem*. The author concludes that the rumen, reticulum and omasum are capable of rapid absorption of water and of substances in solution and that absorption is equally rapid in the first two of these compartments ; that the abomasum also absorbs although more slowly ; and that the widely held view that protective mucosae are only permeable with difficulty to water and aqueous solutions must be revised.—H. H. Green.

Barry, D. T. (1933). **On the Nervous Control of Abdominal Blood Vessels and Viscera.**—*Brit. Med. J.* August 26th. 373-376. 6 figs. [24 refs.]

Cardio-inhibitor fibres have been found in the dog, arising from the vagus nerve below the root of the lung. It is concluded also that the vagi supply both

hyper- and hypo-tensive fibres to the splanchnic blood vessels. After section of the splanchnic nerves, the chronaxie of the vagal motor fibres to the stomach is diminished.—Henry Dryerre.

Sjollema, B., & Seekles, L. (1933). Die neuromuskuläre Reizbarkeit in Beziehung zur Biochemie der Minerale. 1. Mitteilung: Der Einfluss einer Aenderung des Ca/P-Verhältnisses in der Nahrung. 2. Mitteilung: Der Einfluss einer Aenderung des Ca/P-und Na/K-Verhältnisses in der Nahrung. **[Neuromuscular Excitability in Relation to the Biochemistry of Minerals. 1. Effect of Changes in the Ratio of Calcium to Phosphorus in Food. 2. Effect of Changes in the Ratios of Calcium to Phosphorus and Potassium to Sodium in Food].**—*Biochem. Zschr.* **258.** 471-479 and **262.** 367-379. 6 tables, 5 graphs. [5 refs.]

The previous work of the authors upon grass tetany of cows led to the more general study of mineral constituents of food in relation to neuromuscular excitability. In the experiments recorded in these two papers male rabbits were fed upon a mineral-poor basal ration and the minerals brought to the desired levels by addition of various salts. The technique of testing neuromuscular condition consisted in placing a stimulating electrode on a shaved area over the median nerve, observing the flexors of the fore-paw and determining the threshold values (in milliamps) for cathode closing current (denoted KS), anode closing (AS) and anode opening (AO). The ratios KS : AO, AS : AO and 1 : (KS+AS+AO) were used as indices of neuromuscular excitability.

The results of the first paper may be summarized as follows:—(1) with a ratio of calcium to phosphorus in the ration of 1 : 4·54 AS/AO was normal but at 1 : 5·62, or higher, this figure rose to a point indicating latent tetany (earlier values of Hess, for AS/AO, were 0·62 for normal rabbits, 1·21 for latent tetany, 2·02 for manifest tetany); (2) the figures obtained for calcium, magnesium, and inorganic phosphorus of the blood serum allowed of no definite correlation with the mineral composition of the diet or the threshold values for electrical stimulation and (3) considerable individual differences occurred in the different animals with respect to the calcium phosphorus ratio of the ration and the observed neuromuscular excitability.

The results of the second paper showed that:—(1) nervous irritability was low on a ration with normal mineral relationships (sodium : potassium = 1 : 6·1, calcium : phosphorus = 1 : 0·78, calcium : potassium = 1 : 3·52, and calcium : magnesium = 1 : 0·132), and the quotient AS/AO was generally below unity; (2) the AS/AO values were generally raised by abnormal sodium-potassium ratios (Na : K = 1 : 542); (3) with abnormal calcium-phosphorus ratios (Ca : P = 1 : 8·4) the neuromuscular excitability was increased, with occasional tremors of the jaw muscles and positive Trousseau phenomenon; (4) marked increase of excitability, with considerable daily variations, occurred on rations abnormal with respect to both calcium-phosphorus and sodium-potassium ratios; (5) when little alteration was shown on abnormal mineral ratios this could be partially explained by the tetany-inhibiting influence of the calcium-magnesium ratio, Ca : Mg being 1 : 0·865 (as against 1 : 0·132 for normal food) during the two periods on abnormal Ca : P and Na : K; (6) the rations with abnormal mineral ratios were not well eaten by the rabbits but fasting, which itself increases the AS/AO value, was never so extreme as to explain the observed changes and (7) no influence on neuromuscular excitability could be attributed to variations in external conditions—barometric pressure, relative humidity or temperature.—H. H. Green.

SJOLLEMA, B., & SEEKLES, L. (1933). Die neuromuskuläre Reizbarkeit in Beziehung zur Biochemie der Minerale. 3. Die minerale Zusammensetzung von Blutserum und Muskelpressaft bzw. deren Ultrafiltraten im Zussammenhang mit der neuromuskulären Reizbarkeit. Der Einfluss der Parathyreoidektomie auf das Ca/Mg-Verhältnis des Blutserums. [**Neuromuscular Excitability as Related to Biochemistry of Minerals. 3. Mineral Composition of Blood Serum and Muscle Juice, or their Ultrafiltrates, as related to Neuromuscular Excitability. Effect of Parathyroidectomy on the Ratio of Calcium to Magnesium in Blood Serum**].—*Biochem. Zschr.* **264.** 316-333. 8 tables. [21 refs.]

A continuation of physiological work commenced in relation to grass tetany of cows [see above]. Evaluation of the significance of the data requires consultation of the original protocols, which include determinations of Na, K, Ca, Mg, P and Cl on the blood serum and serum ultrafiltrates of rabbits fed on diets low in Na but high in K, and low in Ca but high in P. On diets which increased neuromuscular excitability (latent tetany) the ratio of Ca to P in the serum was reduced but the ratio of Ca to Mg not materially altered.

In the tetanic condition produced in parathyroidectomized dogs the serum ratios of Ca to Mg and Ca to P were reduced, in distinction to grass tetany of cows in which the former ratio is much increased and the latter little changed.

In muscle juice (rabbits) the total Ca was approximately doubled on the diet low in Ca and Na and high in P and K but total Mg showed no relation to neuromuscular excitability. The mineral composition of serum and of muscle juice are, therefore, not related to neuromuscular excitability in the same way. The ratio of basic to acid ions in the diet did not, as such, influence excitability.

—H. H. GREEN.

NIELSEN, F. (1933). Undersøgelser over Baekkendimensionerne hos Søer. [**Investigations into the Dimensions of the Pelvis in Sows**].—*Maanedsskr. Dyrl.* **45.** 33-52. 4 figs., 5 tables, 1 graph.

During the years 1921 to 1931, the number of pigs in Denmark rose from about 1,430,000 to about 5,500,000. During this period it was quite customary for the sows to be covered for the first time at the age of four to five months. When they were about to farrow at the age of eight to nine months, dystocia very frequently arose owing to the small size of the pelvic ring. When these sows were sold, lawsuits often followed when labour had been unsuccessful.

In order to ascertain the minimum dimensions of the pelvis of the sow necessary for normal delivery, the author has carried out a number of pelvic measurements.

In order to estimate the size of a given pelvis, it is necessary to determine the dimensions of the pelvic inlet (the conjugata vera and the maximum transverse measurement) and the transverse measurements between the spinae ischiadicae.

On the basis of the weight of new-born pigs of 40 different litters, the author has found that the average weight of the biggest pig in one farrow can be fixed at 1,600 g. in primiparous sows. He gives his observations, according to which, on this basis, the pelvis must have the following minimum dimensions :—(1) the conjugata vera, 10 cm. ; (2) maximum transverse measurement in the pelvic inlet, 7 cm. ; (3) minimum transverse measurement across the edge of the spinae ischiadicae 6·5 cm. and (4) minimum transverse measurement between the interior aspects of the spinae ischiadicae, 6·5 cm.

In case of dystocia in a primiparous sow the above measurements must be compared with the weight of the pigs in order to settle the question whether there

is an abnormally contracted pelvis.—H. C. Bendixen (Copenhagen).

Runge, S. (1932). Ciezar, wielkosc i ksztalty jajników u krów. **[Weight, Size and Shape of the Ovaries in Cows]**.—*Wiadom. wet.* **11.** 156-171. 7 tables, 8 diagrams. [40 refs.] [Summary in German : abst. from orig.]

On the basis of the examination of 128 ovaries from non-pregnant cows and of 96 ovaries from pregnant cows, the author states that the ovaries of pregnant cows are heavier and larger than those of non-pregnant cows. The right ovaries are heavier and larger than the left ovaries both in pregnant and non-pregnant cows. Mature Grafian follicles may be found both in non-pregnant and pregnant cows ; those in pregnant cows rarely appear in the right ovaries and in non-pregnant cows they are found very often in the left ovaries. Corpora lutea are more frequent in ovaries of non-pregnant than of pregnant cows. Corpora lutea graviditatis of the same weight and size are found in twin pregnancy in both ovaries. In pregnant cows corpora lutea graviditatis are found regularly in the right ovaries. Cysts are found more frequently in non-pregnant cows and then only in the left ovary. The cysts and the mature follicles are found both in non-pregnant and in pregnant cows, but only in the ovaries on the right side.

—K. Szczudlowski (Lwów).

Courrier, R., & Kehl, R. (1933). Nouvelles recherches sur la gestation chez la Lapine. **[New Research on Gestation in the Rabbit]**.—*C. R. Soc. Biol. Paris.* **112.** 940-942. [6 refs.]

It appears to be uncertain whether the secretion of the corpora lutea is essential to a successful pregnancy in the rabbit ; a number of workers have found that removal of the ovaries before the end of gestation results in abortion. The authors record experiments in which normal sequelae to pregnancy were obtained after the removal of the ovaries by the administration of an extract of corpus luteum on or after the 21st day.—Norman Hole.

I. —. (1933). **The Oestrus-Producing Hormone International Standard.**—*Lancet.* **224.** 1361.

II. Skarzynski, B. (1933). **An Oestrogenic Substance from Plant Material.**—*Nature.* **131.** 766. [1 ref.]

I. The oestrus-producing hormone has been the subject of extensive investigation and has been prepared in pure crystalline form. The Permanent Commission on Biological Standardization agreed that the standard is a quantity of the keto-hydroxy form of the hormone in pure crystalline condition which is preserved at the National Institute for Medical Research, London ; the unit of activity is defined as the specific oestrus-producing activity contained in 0·001 mg. of this standard preparation. Institutions or individual workers in Great Britain and Ireland requiring the standard for the oestrus-producing hormone should apply to the Department of Biological Standards, the National Institute for Medical Research, Hampstead, London, N.W.3.

II. The writer of this preliminary communication was able to obtain 7·5 mg. of a crystalline substance from 65 kg. of female willow flowers. These crystals showed themselves to be very similar in chemical and physical properties, but less active than trihydroxyoestrin obtained from urine. On testing the melting-point of a mixture of trihydroxyoestrin crystals and crystals from willow, the melting point was only 1°C. lower than that of pure trihydroxyoestrin.

—J. A. Nicholson.

I. Parhon, C. I., Coban, S., & Fastlich, G. (1933). La castration ovarienne exerce-t-elle une action favorable sur la durée de survie des animaux thyro-parathyroidectomisés ? [**Is Ovariotomy Beneficial to the Time of Survival of Thyro-Parathyroidectomized Animals?**]—*C. R. Soc. Biol. Paris.* **112.** 1441-1442.

II. —. (1933). **The Female Sex Hormones.**—*J. Amer. Med. Ass.* **100.** 1341-1342. [4 refs.]

I. In a series of adult bitches ovariotomy and thyro-parathyroidectomy were performed and in another series of bitches and dogs, thyro-parathyroidectomy was performed but the reproductive glands were not removed. It was found that the average time of survival after operation in the first series was 5·66 days, whereas in the others it was 6 and 6·2 days respectively. It would appear, therefore, that extirpation of the ovaries has no beneficial effects after thyro-parathyroidectomy.

II. Until recently, the use of so-called female sex hormones has been limited to desiccated ovarian products and various extracts which have been employed empirically. Now, however, two hormones have been isolated in crystalline form which are of demonstrable potency in producing oestrus in animals. From the clinical point of view the evidence does not warrant an extensive routine application to therapeutics of the experimental results thus far achieved, but there are indications, which require careful clinical observation, that beneficial effects may result from the use of these substances in human medicine.—J. A. Nicholson.

Grant, R. (1933). **Occurrence of Ovulation without 'Heat' in the Ewe.**—*Nature.* **131.** 802. [1 ref.]

A recent study of reproductive phenomena in the ewe has shown that, in this animal, ovulation occurs regularly during the month previous to the commencement of the breeding season, and occasionally during the breeding season, without the exhibition of mating. This conclusion is mainly based on the following points. Four out of 5 ewes killed before their breeding season showed corpora lutea in their ovaries. The vaginal discharges from ewes kept with vasectomized rams showed one or more cycles of oestrus changes before the first " heat " period had occurred. Certain of these ewes killed during the breeding season showed in their ovaries one or two more generations of corpora lutea than could be accounted for by the number of full oestrus periods through which they had passed.

—J. A. Nicholson.

Stalfors, H., & Hoflund, S. (1933). Graviditetsdiagnos genom hormonreaktion. [**Diagnosis of Pregnancy by the Hormone Reaction**].—*Svensk Vet.-tidskr.* **38.** 243-245.

The authors employed the ovarian hormone biological test for the diagnosis of pregnancy in 64 mares and obtained positive results with all but two of them between the 6th and 8th weeks of gestation, though all were pregnant.—J. E.

I. Fiore, F. (1933). La reazione di Manoiloff nella diagnosi di gravidanza della vacca. [**Diagnosis of Pregnancy in the Cow by Manoiloff's Reaction**]. —*Profilassi.* **6.** 181-183. [18 refs.] [Summaries in English and French : abst. from orig.]

II. Palmer, C. C. (1933). **Relation of the Alcohol-Milk Test to Pregnancy in Cattle.**—*J. Amer. Vet. Med. Ass.* **82.** 694-706. 4 tables. [11 refs.]

I. In an attempt to obtain a satisfactory biological method for the diagnosis of pregnancy, the author considered that the good results claimed by Manoiloff for his method in the human subject justified its application to farm animals.

Manoiloff's technique was followed in detail. This consists essentially in mixing 0·3 c.c. of fresh serum, 1 c.c. of a 2 per cent. solution of diuretin and a drop of 0·2 per cent. Nile blue solution, and then observing the colour reaction which appears from a few minutes to a few hours after the solutions have been mixed.

The test was applied to 150 non-pregnant and 20 pregnant cows, as well as to pregnant and non-pregnant sheep and goats and to bulls, bullocks and rams. From his results the author concludes that the method is of no practical value, as positive and negative reactions were observed in both pregnant and non-pregnant animals and in male animals. Moreover, because of the difficulty in deciding the exact colour produced, a large number of doubtful reactions were met with.

II. It has been shown that the power of absolute alcohol to coagulate milk, when these two substances are mixed in equal proportions, depends primarily upon the presence of the milk salts, a slight increase in the magnesium or calcium content of the milk over the citrates and phosphates causing coagulation. It was thought that the proportions of these salts in milk from pregnant cows might differ from those of non-pregnant animals and so make the test a reliable one for the diagnosis of pregnancy.

In a study of 77 pregnant and 143 non-pregnant animals it was found that no correlation exists between the alcohol test and pregnancy. Approximately 50 per cent. of the non-pregnant and 70 per cent. of the pregnant cows gave positive reactions. When the test was carried out at monthly intervals, it was found that an individual animal, whether pregnant or non-pregnant, might give a positive reaction one month and a negative reaction the following month.

—J. A. Nicholson.

Karman, P., & Wiethoff, F. (1933). Die Feststellung der Trächtigkeit der Stuten durch den Mäuseversuch. [**The Diagnosis of Pregnancy in Mares by means of Mouse Tests for Ovarian Hormone**].—*Tierärztl. Rdsch.* **39.** 1-4. 1 table. [17 refs.]

40 tests on 33 mares (15 pregnant and 18 non-pregnant) show that pregnancy in mares can always [as far as these experiments are concerned] be ascertained by the detection of the ovarian hormone in the urine by injection into female white mice. By using blood serum from the mares instead of urine the experiments become cheaper, easier and more reliable and in addition pregnancy can be detected earlier. The examination of 8 pregnant mares by the 2 tests showed that with the serum test, pregnancy could be diagnosed at the 43rd-51st days as compared with the 43rd-100th days with the urine test.—W. R. Wooldridge.

Wills, Lucy. (1933). **The Nature of the Haemopoietic Factor in Marmite.**—*Lancet.* **224.** 1283-1286. 1 table. [15 refs.]

Marmite, which is made from yeast by a process of autolysis, has the power to stimulate the production of reticulocytes. It has been used for the cure of tropical macrocytic anaemia and the pernicious anaemia of pregnancy. Preparations of vitamins B_1, B_2 and B_4 were inactive in producing a reticulocytosis. So also were watery extracts of yeast or whole yeast itself. The active principle in marmite is soluble in water and in 80 per cent. alcohol. It withstands autoclaving for five hours at pH 5·5, but is partly destroyed by autoclaving for ten hours at pH 9·0. It is suggested that the haemopoietic factor may be a protein cleavage product produced during the manufacture of the marmite.—Henry Dryerre.

Mellanby, J. (1933). **Thrombase—Its Preparation and Properties.**—*Proc. Roy. Soc. London. Ser. B.* **113.** 93-106. 10 tables. [17 refs.]

Thrombase is prepared by precipitating prothrombase from oxalated plasma, by the addition of acetic acid. The supernatant liquid is removed and the residual moist prothrombase allowed to stand for 24 hours. The resultant crude thrombase is dissolved in a neutral solution of sodium chloride and acidified with acetic acid. The supernatant liquid is removed and the purified thrombase is precipitated from it by the addition of a large volume of acetone.

Thrombase so prepared is soluble in water, slowly dialysable, destroyed by acid or alkali, inactivated on heating at 60°C. for five minutes and gives most of the protein reactions. One mg. will coagulate 100 c.c. oxalated plasma in 30 seconds. The intravenous injection of 2 mg. into a rabbit caused intravascular clotting and death within seven minutes. The time of action of thrombase is roughly inversely proportional to its concentration and the time tends to be prolonged in proportion to the dilution. Thrombase is adsorbed by the precipitated fibrin in proportion to its original concentration. It is suggested that thrombase is a proteoclastic enzyme which splits fibrinogen into fibrin and serum globulin.
—Henry Dryerre.

Delas, R. (1933). Cholestérolémie et résistance osmotique des hématies. **[Cholesterolaemia and Osmotic Resistance of the Red Blood Corpuscles].**—*C. R. Soc. Biol. Paris.* **113.** 1018-1020.

It has been suggested by several authors that the resistance of R.B.C. to haemolysis is proportional to the amount of cholesterol in the blood. The results of an investigation carried out on 94 animals including sheep and lambs, cows and calves, horses, pigs, rabbits and pigeons do not support this contention. The technique adopted was to compare the varying amounts of cholesterol in the total blood, corpuscles and plasma of the animals with the resistance of their R.B.C. to the action of hypotonic saline.—James Stewart.

Sampson, J., Gonzaga, A. C., & Hayden, C. E. (1933). **The Ketones of the Blood and Urine of the Cow and Ewe in Health and Disease.**—*Cornell Vet.* **23.** 184-207. 10 tables. [36 refs.]

A preliminary report on the effects of normal and abnormal pregnancy and the post-parturient diseases upon the alkali reserve and the ketones of the blood and urine of the cow and ewe. From the results of the analysis of samples obtained from 20 cows at monthly intervals up to parturition and for three consecutive days after, it was concluded that there was a slight decrease in alkali reserve during the last half of the gestation period with a quick return to normal after parturition. From examination of urine and blood of several cases of milk fever and acetonaemia it is suggested that they are not separate and distinct diseases, though the authors admit that there is not enough evidence to declare that they are identical.

From the data accumulated from the study of nine cases of the so-called " pregnancy disease " in ewes, it is considered that this disease also resembles typical acetonaemia of cows, being characterized by an acidosis which is not caused by a disturbance of the calcium metabolism and by a uraemia which sets in at the terminal stage of the disease. It is recommended that the ketosis can be overcome by a daily intravenous injection of 500 c.c. of a 5 per cent. solution of glucose as soon as the symptoms are observed.—James Stewart.

Pribyl, E. (1933). Obsah elektrolytů v krevním seru ovcí a koz a v krevním seru krav při některych chorobách, zejména chorobách v době gravidity a puerperia. **[Electrolyte Content in the Blood Serum of Sheep and Goats and in the Blood Serum of Cows in Certain Diseases, particularly in the**

Period of Pregnancy and in Connection with Milk Fever].—*Zverol. Rozpravy. Suppl. Zverol. Obzor.* **7.** 61-70 and 73-78. 5 tables. [9 refs.]

Results are given of systematic examinations of blood serum of sheep, goats and cows for calcium, inorganic phosphorus, magnesium, sodium, potassium and for chlorides and inorganic sulphates.

In the blood serum of healthy sheep and goats, the following values of mineral constituents in mg. per 100 c.c. were found: Ca, 6·2 to 8·34; inorganic P, 2·93 to 10·1; Mg, 1·0 to 2·74; Na, 195·6 to 400·0; K, 18·11 to 28·3; S (inorganic sulphate), 1·16 to 4·92. The content of inorganic phosphates in the blood serum of young individuals is higher than in adult animals.

A decrease in inorganic P was shown in the blood serum of a cow affected by *ante-partum* paralysis and in the majority of cases of cows with retained placentas.

In the blood serum of cows suffering from milk fever, the level of Ca and inorganic P was found to be decreased, whereas the Mg content was increased. The prevalence of cations (Ca, Mg, Na, K) over anions (Cl, S, P), expressed in milli-equivalents for 100 c.c. of blood serum, increased as soon as the animals recovered. The findings corroborate KLOBOUK'S theory that milk fever is magnesium narcosis [see this *Bull.* **2.** 567].—E. PRIBYL (BRNO).

I. NESENI, R. (1933). Die Eiweisskörper der Kuhmilch. 3. Das Stickstoffverhältnis in der Milch bei gesunden und kranken Kühen. [**Proteins of Cow's Milk. 3. Nitrogen Distribution in Milk of Healthy and Diseased Cows**].—*Milchwtsch. Forsch.* **14.** 549-566. 14 tables. [47 refs.]

II. KIEFERLE, F. (1933). Gestörte Sekretion. 3. Verhalten de stickstoffhaltigen Bestandteile der Milch, insbesonder des Reststickstoffs bei gestörter Sekretion. [**Abnormal Secretion. 3. Nitrogenous Constituents of Milk, especially Residual Nitrogen in Disturbances of Secretion**].—*Ibid.* 567-585. 9 tables, 7 charts. [5 refs.]

I. Discusses the literature on " nitrogen partition " [see footnote] in cows' milk and records fresh data under a variety of healthy and diseased conditions.

The author found :—(a) small variations in the ratios of nitrogenous constituents in morning milk as compared with evening milk and in first milk as compared with strippings; (b) in four castrated cows (operation for nymphomania) no change in total N or albumin N but a slight fall in casein N and slight rise in rest-N; (c) insignificant variations during oestrus; (d) in two cows with nymphomania, casein and albumin a little below the average and rest-N a little above; (e) in a case of leukorrhea (clinically described) in which the milk yield was much reduced, no material change in the ratio of nitrogenous constituents; (f) in a case of vaginitis traumatica, albumin and rest-N slightly raised; (g) in one case of traumatic peritonitis and one of catarrhal fever, all nitrogenous constituents raised with a relative rise in rest-N in the latter; (h) in cases of tuberculosis (positive findings in sputum), milk normal or insignificantly altered; (i) in udder diseases of whatever origin, marked rise (double or more) in total nitrogen and marked alteration of the nitrogen partition—values for casein being generally reduced and for rest-N increased.

The general impression made by the data is that in acute diseases of cows, general or local, there is a slight rise of absolute values but no displacement of relative values and that really significant changes in the milk are confined to specific disorders of the udder itself.

II. The author tabulates extensive analytical data for milk in respect to total nitrogen, casein, albumin, albumose, peptone, " rest nitrogen " [residual nitrogen—see note], amino-nitrogen, ammonia, urea, creatine, creatinine, uric

acid (all expressed in terms of nitrogen), lactose, chloride and specific gravity, comparing in particular the figures for healthy quarters of the udder and quarters affected with mastitis. More limited data are also provided comparing machine-milked and hand-milked samples.

In general he finds a material increase in residual nitrogen and a reduction in casein in milk from diseased udders. Milk albumin could rise markedly in anomalous secretion but it was doubtful whether this was due to genuine lactalbumin or to serum albumin and lyophile complexes coagulable by heat.

The rise in residual nitrogen could be largely accounted for as albumose, peptone, polypeptide and amino-nitrogen. Urea, creatine and creatinine could also rise markedly in severe disturbances of secretion. Casein, lactose and citric acid could undergo marked simultaneous diminution. Correlations are shown between chloride and lactose and between various nitrogenous constituents ; these are useful in diagnosing the nature of the abnormality.

The figure for residual nitrogen was a useful indicator of inflammatory processes in the gland, confirmable by clinical and bacteriological examination. Acute mastitis showed figures many times above normal, while irritation of the udder (sometimes produced by machine milking) occasioned only a very slight rise. An increase of residual nitrogen was usually, but not always, accompanied by increase in chloride. Disturbance of secretion is not necessarily associated with rise in chloride content of milk (as often supposed), and *vice versa*.

[In analysing physiological fluids it is customary to express the various nitrogenous constituents in terms of nitrogen (N) expressing each separately as a proportion of the total in order to show the " partition " or relative distribution of the individual compounds present. If it is desired to express in terms of the compounds themselves the nitrogen values are then multiplied by their appropriate factors (e.g. protein-N $\times$ 6·25 = protein as such). Since the compounds which it is possible or desirable to estimate individually do not necessarily include all the nitrogenous substances actually present the term " rest-N " or " residual nitrogen " is often used to indicate the residue obtained by subtracting the sum of the fractions determined separately from the total nitrogen found. The meaning of the term therefore varies somewhat with the amount of detail shown in the analyses. In the first of the two papers above casein and albumin were determined in addition to total nitrogen, and " residual nitrogen " therefore includes all the nitrogenous compounds except these two. In the second paper this " non-protein nitrogen " was frequently investigated further and subdivided into amino-nitrogen, urea, creatinine, etc.].—H. H. Green.

I. —. (1933). **The Suprarenal Cortex.**—*Lancet.* **225.** 195-196. [5 refs.]
II. —. (1933). **The Suprarenal Cortex.**—*Brit. Med. J.* June 10th. 1013-1014. [7 refs.]

I. Swingle & Pfiffner [(1932). *Medicine.* **11.** 371.] have been able to obtain an extract of whole suprarenal gland which contains a very low adrenalin content and which will maintain dogs in perfect health after adrenalectomy has been performed. In human therapeutics such extracts have proved capable of rescuing patients from the acute phases of Addison's disease. The function of the suprarenal cortex, however, still remains obscure. Large doses of the hormone appear to be without toxic action, but indications have been obtained that it has an influence on respiratory metabolism. It has been shown that the cortex is rich in hexuronic acid which is closely connected to vitamin C, and as a source of this vitamin fresh cortex has proved three times as potent as orange juice.

II. The estimation of the potency of cortical extracts by the prolongation of the lives of suprarenalectomized animals gives no information as to the action of the substance in the body; it merely indicates that the tissue is essential to life. No clearly defined end-effect has yet been found. The rise of blood urea after extirpation of the glands is evidence of a certain degree of renal failure and the symptomatology after the operation in animals can be correlated with the progress of this rise. An outstanding feature of the injection of the cortical hormone into normal subjects (human and animal) is a striking increase in the power of doing work. There is little doubt that the suprarenal cortex is intimately connected with the maintenance of sex balance and must be considered as having some relation to the pituitary gland. Whilst many new facts concerning the activity of the suprarenal cortex have recently come to light, much further knowledge is required before the function of this gland can be fully understood.—J. A. Nicholson.

Ottaviani, G., & Cavalli, M. (1933). Contributi all'anatomia del sistema linfatico del gatto. **[The Anatomy of the Lymphatic System of the Cat]**.—*Nuova Vet.* **11.** No. 5. 5-27. 9 figs.

For this anatomical study 50 cats of various ages and of both sexes were employed. The injection technique devised by one of the authors was used to facilitate the observation of the lymphatic system. The paper is divided into three parts. Part 1 deals with the lymphatic glands and vessels; part 2 with the principle branches of the lymphatic system and part 3 is given up to comparative considerations. A careful description is given of the size, shape, relationships and variations met with in the various parts of the lymphatic system. It is pointed out that two types of thoracic duct are commonly met with in the cat. In one case the duct is single at the beginning, but divides into two branches which in a short time reunite to form a single duct. In the other case the duct arises as two rami which anastamose with each other and eventually become a single duct. During its course through the abdomen the duct receives various main lymphatic branches.

There is usually only one true submaxillary lymph gland in the cat; the gland which lies laterally to the submaxillary gland should, more properly, be called the anterior superficial cervical gland. In the cat there are posterior superficial cervical glands. In the thorax the anterior mediastinal lymph glands are subject to many variations as regards position, number and size and there exists a sternal lymph gland situated dorsally to the manubrium sterni. In cats the inguinal gland is placed towards the subinguinal region and is always more superficial than the corresponding gland in guinea pigs. The inguinal glands form a single group. The lymphatic jugular branches may be divided into external and internal; occasionally only the deep branch is present. The lumbar branches have a larger development in number and size than those of rodents.

The article is accompanied by some clear drawings. It does not, however, lend itself to abstraction and readers are advised to consult the original work. —J. A. Nicholson.

Nörr, J. (1933). Ueber Körpertemperatur, Herztätigkeit und Atmung des Silberfuchses. **[The Body Temperature, Heart Activity and Respiration of Silver Foxes]**.—*Arch. wiss. prakt. Tierhlk.* **66.** 136-149. 2 figs., 5 tables.

The rectal temperatures of apparently healthy silver foxes vary between 38° and 42·4°C. but the majority fall between 40° and 41°C. Animals less than six months old usually have a temperature slightly higher than adults. As the result of excitement the temperature may be raised at times to 42·4°C.

The frequency of the heart-beat varies between 76 and 240 a minute, but

from 100 to 125 is the usual rate. Three animals out of 130 examined gave the abnormally low frequency of 48 to 56 beats a minute.

Inspiratory movements varied between 12 and 60 a minute, the average variation being from 20 to 25. Animals with lung parasites showed no noteworthy alteration in the body temperature or pulse rate, but the rate of respiration was definitely increased. No change in any of these values was found in rachitic animals. Two graphs depicting electrocardiograms of foxes are given.

—W. R. WOOLDRIDGE.

FRENCH, M. H. (1933). **Animal Nutrition Research.**—*Ann. Rep. Dept. Vet. Sci. & Anim. Husb. Tanganyika. 1933.* pp. 29-71. 62 tables.

This sub-section of the Report on the Work of the Veterinary Laboratory, Mpwapwa, represents an enormous amount of valuable work. The first paragraphs outline the nature of the work :—

" The most widely adopted system of rationing livestock depends upon a knowledge of the starch equivalent and digestible protein values of the foodstuffs. These values have never yet been determined for many East African feeding stuffs under East African conditions through actual animal experiments. Without such data it is impossible to ration economically. It is possible to get rough approximations by using the values found for the feeding stuffs in other parts of the world. Large errors may arise, however, owing to the composition of the product differing in the two regions (i.e. English meadow hay and hay from Njombe). Even if the compositions are the same we are not yet sure that the European animal digests and assimilates his food to the same extent as the native.

" During the last year an attempt has been made to fill up this gap in our knowledge and the starch equivalent and digestible protein values have been determined for a number of the most common feeding stuffs available in this Territory. This information is a continuation of last year's report and will be augmented by further work of a similar nature next year."

Then follow notes on and analyses of such local foodstuffs as velvet beans, cowpeas, groundnut cake, *Lupinus* sp., lucerne hay, cotton seed, meat meal, blood meal, bone meal, carcass meal, dried locusts, groundnut tops, leaves of *Disperma trachyphyllum*, acacia pods, maize bran, millet bran, maize silage, cassava roots, and grass silage. In many instances comparisons are made between the composition of the local product as determined by analysis and the same substance grown in other countries, showing conclusively with what reserve the stock-owner should accept foreign figures when compounding diets of local foodstuffs. Some of the substances dealt with are local plants, such as leaves of the common shrub *Disperma trachyphyllum* and pods of *Acacia spirocarpa* and *A. albida*, concerning the value of which no information at all is available from outside sources.

The article on maize silage is of great interest, for it indicates the method of manufacture best suited to Tanganyika, namely, to cut the maize before the cobs have reached the " milky " stage, and to ensile the plants by placing them lengthways in a long pit which can be opened at one end and the silage cut out in lengths of about six inches by means of a hay knife.

The article on hay shows that, as elsewhere, great advantage is gained by making hay with grass as young as possible. " Over a large proportion of this Territory there is a definite break in the rains and this period should be used for making all the available grass into hay and then a second crop can be obtained when the dry season comes along."

Of interest, too, are accounts of the value of cotton-seed as a supplementary feed for native cattle, showing that the feeding of 2 lb. daily during the lean months may make all the difference between steady loss and slight gain of weight. Information is also furnished on the subject of feeding high-grade cattle.

The author concludes with tables of results of the first part of a phosphate-sufficiency survey of the Territory, using the Onderstepoort blood analysis method.

He states that there is no phosphate deficiency disease in most parts of the Central Province.—S. A. Evans.

I. du Toit, P. J., Malan, A. I., Louw, J. G., Holzapfel, C. R., & Roets, G. C. S. (1932). **A Study of the Mineral Content and Feeding Value of Natural Pastures in the Union of South Africa—(First Report).**—*18th Rep. Direct. Vet. Serv. & Anim. Indust. Union of S. Africa.* Part II. pp. 525-577. 7 tables, 1 map. [13 refs.]

II. Henrici, M. (1932). **Cystine and Sulphur Content of Bushes and Grasses in a Karroid Area (Fauresmith).**—*Ibid.* pp. 579-595. 7 tables. [19 refs.]

Two papers which, because of the mass of analytical protocols, require consultation in the original.

I. This is a first account of an ambitious survey, commenced in 1930, on mineral deficiencies in South African soils and pastures. In the case of phosphorus the blood of cattle grazing over the pastures is also studied. The analyses of pastures include phosphorus, calcium, magnesium, sodium, potassium, chlorine, fibre, crude protein and carbohydrate plus ether extract. Surveys carried out with the collaboration of about 40 veterinary field officers are undertaken at four seasons of the year and the plan of work involves correlation of soils, pastures, climate and response of animals.

II. Determinations of total sulphur, crude protein and cystine were made on a number of different bushes and grasses growing in the karroid area of Fauresmith (Orange Free State). No relation subsisted between these three constituents. The results are discussed from the point of view of the plant physiologist.

—H. H. Green.

Cunningham, I. J. (1933). **Magnesium in Animal Diets.**—*New Zealand J. Sci. & Tech.* **15.** 191-198. 4 tables. [12 refs.]

The author performed this work on the assimilability of magnesium in rats, to be followed by similar work on sheep and cattle, on account of the necessity for greater knowledge in the use of Mg salts to combat " grass staggers " in cattle.

A balanced diet was fed to rats and additions of $MgCO_3$, $MgSO_4$, $MgCl_2$ and acid phosphate in quantities of 0·2 and 1 per cent. were made. Analyses were made at the end of five weeks on the rat carcasses and on bones of the rats.

Experimental evidence showed that the Mg of the bones and carcasses increased in proportion to the quantity of Mg fed. Of all salts fed $MgCO_3$ gave the best results. Ca in the bodies was not greatly altered, but there was a tendency for a lowered blood Ca when the blood Mg was higher than normal. The growth rate of rats was not interfered with.—C. S. M. Hopkirk.

Harris, L. J., Clay, Janet, Hargreaves, Florence J., & Ward, A. (1933). **Appetite and Choice of Diet. The Ability of Vitamin B Deficient Rat to Discriminate between Diets Containing and Lacking the Vitamin.**—*Proc. Roy. Soc. London. Ser. B.* **113.** 161-190. 17 figs. [11 refs.]

It is often thought that animals given a suitable free choice of diets take the foods best suited to their needs and that the selection is due to an inherent instinct. By a series of feeding experiments during 1928-1931 the authors set themselves the task of elucidating the actual process involved in the action of food selection. A moisture-free basal diet was used consisting of vitamin-free casein 20 per cent., starch or sugar 55 per cent., arachis oil 20 per cent., salt mixture 5 per cent. and cod liver oil two drops per day. To this, various supplements to be tested were added. The food was worked up to a tackiness and placed in narrow jars ; jars

plus food were weighed daily and the amount consumed determined. The results of the experiments are thus summarized : A rat depleted of vitamin B (or B_1) and then offered the choice of two diets, one devoid of vitamin and the other containing not more than a bare adequacy of it—and in some distinctive form, such as marmite or yeast or wheat germ—will almost invariably select the latter diet. A rat not so depleted will eat the two diets indiscriminately until it suffers from vitamin deficiency when it will select the vitamin-food. If the number of foods used is large, the rat may not discover the vitamin, but may be " educated " to select it and thereafter recognize it. The addition of a highly potent vitamin concentrate may not be detected until a food of distinctive character (e.g. bovril) is added. If then the concentrate be mixed in a different food the rat may be " deceived " but may be " re-educated " to make the right selection. A point the authors wish to stress is the immediate benefit derived from the vitamin-food ; thus, selection is a matter of experience rather than of " instinct."—R. G. Linton.

Pribyl, E. (1932). Obsah minerláních látek v krevním seru krav brezích a nebrezích, krav po porodu a ssajících mlád'at. **[The Mineral Content of the Blood Serum of Cows during Pregnancy and after Calving and of New-Born Calves].**—*Klin. Spisy Skoly Zverol. Brno.* **9.** 219-286. 19 tables. [64 refs.] [Summaries in French and German : abst. from orig.]

The author determined the content of calcium, inorganic phosphorus, magnesium, sodium, potassium, chlorine and sulphur (inorganic sulphates) in the blood serum of cows at different stages of pregnancy and at the puerperium, and compared the figures with those obtained by examination of the blood sera of sterile cows and new-born calves. It was found that the Ca and inorganic P content in the blood serum depended greatly upon the content of those minerals in the food. A few days before and after parturition, the Ca and inorganic P in the blood serum decreased. The mineral content in the blood serum of new-born calves before first suckling was lower than that of their dams. The proportion of cations (Ca, Mg, Na, K) to anions (P, Cl, S), expressed in equivalents, remains almost unchanged during the periods of pregnancy and the puerperium. The prevalence of cations is greater in the blood serum of cows than in the blood serum of new-born calves.—E. Pribyl (Brno).

Carr, F. H., & Jewell, W. (1933). **Characteristics of Highly Active Vitamin A.** —*Nature.* **131.** 92. [2 refs.]

Details are given of the physical data relative to the preparation and properties of a very active vitamin A. The fractionation was carried out at a pressure of 10^{-5} mm. Hg. The heat input was carefully regulated and there was a difference of 5° to 7°C. between the various fractions. The portion boiling between 136° and 137°C. gave physical constants which indicated that it is a purer vitamin A than any hitherto described. Its alcoholic solution shows no optical rotation. The antimony trichloride blue value is 78,000 compared with 65,000 for the best previous sample. The international unit for vitamin A is 0·001 mg. of standard carotene. The above preparation when tested biologically showed a potency of twice this strength.—Henry Dryerre.

—. (1933). **The Parental Transmission of Vitamin A.**—*J. Amer. Med. Ass.* **100.** 742. [2 refs.]

There are mild degrees of vitamin deficiency which may not reach the dignity of disease, but may prevent robust health. This is particularly true of vitamin A. Eusterman and Wilbur [(1932). *J. Amer. Med. Ass.* **98.** 2054.] pointed out that

the versatility of vitamin A has not been appreciated. The mother passes the vitamin on to the offspring. DANN [(1932). *Biochem. J.* **26.** 1072.] has shown in the rat two ways in which the young may receive vitamin A before it is weaned. The vitamin may pass through the placenta to the foetal circulation or it may be ingested post-natally by suckling. The vitamin A store of the young cannot be raised by feeding large quantities of carotene to the mother during pregnancy or lactation. There seems to be some factor limiting the passage of vitamin A from the mother. DANN concludes that the best way to give the offspring a reserve of vitamin A is to administer it directly. Alternatively, the dose can be administered to the mother during the suckling period. Vitamin A given during the pregnancy will not affect the vitamin store in the offspring.—HENRY DRYERRE.

TECHNIQUE.

GILRUTH, J. A. (1933). **A New Apparatus for Treatment of Wounds and Fly-struck Areas on Sheep during Shearing and Crutching Operations.**—*J. Sci. & Indust. Res. Australia.* **6.** 66-67.

The apparatus consists of a small air pump (driven from the engine) and a cylinder provided with a gauge placed where the attendant can observe the pressure, which is maintained at from 50 to 75 lb. per square inch. From this cylinder, a half-inch pipe is led throughout the shed about ten feet above the floor and attached to the uprights of the holding pens. From this horizontal pipe, three down pipes for each group of ten stands descend at intervals to within two inches of the floor. At the end of the down pipe is affixed about 12 feet of rubber tubing which leads to a spray gun similar to those used for the spraying of paint. The gun is fitted with a trigger which, when pressed, emits a spray or jet. While not in use the gun rests on a convenient bracket out of the way.

The cost of installation is relatively moderate; when once established, depreciation is small and the cost of operating negligible.—J. S. STEWARD.

SLAWINSKI, A. (1933). **A New Conductivity Method for the Determination of the Cell Volume of Blood.**—*Biochem. J.* **27.** 356-360. 3 figs. [11 refs.]

It is acknowledged that the haematocrit method for the determination of the cell volume of blood is inaccurate and cannot be much improved. Up to the present the source of error, when the conductivity method is used, is due to the fact that blood as a suspension is often very unstable and stirring does not necessarily bring the corpuscles into a state of equal dispersion. The author has overcome this drawback by the simultaneous use of two conductivity tubes, one horizontal and one vertical. The measurement is made after the blood corpuscles have settled. The ratio of the conductivity of both tubes and the height of the deposit in the vertical tube are then measured. The cell volume is calculated as a function of these data. It is considered that by this method the cell volume of blood can be determined with an accuracy of 0·1 per cent.—J. A. NICHOLSON.

CUMINGS, J. N. (1933). **A Method for the Enumeration of Blood-Platelets.**—*Lancet.* **224.** 1230-1232. [19 refs.]

In this paper the author describes a slight modification of the method described by FLÖSSNER [(1922). *Zschr. Biol.* **77.** 113.] of counting blood platelets. The modification consists in adding mercuric chloride to give a strength of 1 : 10,000 to the Tyrode's solution used for diluting the blood. It is pointed out that the platelets are very easily damaged and very easily clump to each other or to a R.B.C.

They are easily recognized as round, oval or oblong bodies with well defined edges and varying in size from about 1/8 to 1/2 the diameter of a red cell. It was found that the average number for a normal human adult is 700,000 per c.mm. of blood. Counts were also made in certain diseased conditions when a deviation from the normal number was found to exist.—J. A. NICHOLSON.

DAVENPORT, C. (1933). **The "Graduated Tube Method" for Estimation of the Erythrocyte Content of the Blood as a Clinical Aid in the Treatment of Cases of Equine Piroplasmosis.**—*J. Roy. Army Vet. Corps.* **4.** 108-114. 9 charts. [2 refs.]

The apparatus used for the test described consists of glass cylinders of 10 c.c. capacity, which should be tall and narrow, and a 5 per cent. solution of sodium citrate. Two c.c. of the citrate solution is put in a cylinder which is then filled to the 10 c.c. mark with the blood to be tested. With the blood of normal horses, the red cell column is between 2·4 and 3 c.c., whilst readings between 1 and 2·4 c.c. indicate oligocythaemia. At Jhansi, where the author was working, no condition, other than piroplasmosis, causing a deficiency of red cells has been recorded.

A low red cell reading combined with the typical condition of the membrana nictitans is said to be completely reliable in the diagnosis of equine piroplasmosis, due to either *Babesia equi* or *B. caballi*, and may be relied upon even when slide examination is negative. Grave deficiency of red cells and a low initial temperature indicate that there has been delay in reporting the case.

The red cell test also gives valuable information as to whether an animal is fit to return to work. A horse should not be returned to work until the number of red cells has returned to normal even though it may appear, superficially, to have recovered.—U. F. RICHARDSON.

MYERS, V. C., MUNTWYLER, E., BINNS, Dorothy, & DANIELSON, W. H. (1933). **The Colorimetric Estimation of the Hydrogen Ion Concentration of Blood.**—*J. Biol. Chem.* **102.** 19-28. 3 tables. [10 refs.]

It is agreed that the colorimetric method for estimation of pH values when normal plasma is employed is as reliable as the electrometric method and, owing to the ease and rapidity of its operation, is to be preferred for clinical purposes, but its reliability when employed on pathological blood has been questioned. The present paper shows that both alteration of the CO_2 tension and variation of the protein concentration of the plasma play some part in the discrepancy observed between the results obtained by the two methods. A comparison of 45 serum samples of pathological cases showed that the colorimetric estimation was on the average 0·30 pH higher than that of the electrometric.—JAMES STEWART.

GOLDIE, H. (1933). Notes sur la coloration du sang et ses parasites. [**Notes on the Staining of Blood and its Parasites**].—*Bull. Soc. Path. exot.* **26.** 461-464. [1 ref.]

The author recommends a modified Romanovsky method of staining, mainly on account of its rapidity. Two solutions are used. Solution A consists of methylene blue 1 part, borate of soda 8 parts and distilled water 100 parts. This is incubated for four days at 37°C. or kept at room temperature for seven days to allow formation of polychrome methylene blue. Solution B consists of 2 per cent. solution of trypaflavine or gonacrine, 1 c.c., and 2 per cent. solution of eosin, 3 c.c., which are mixed for one to two minutes and then diluted with 6 c.c. of 96 per cent. alcohol.

Slides are fixed by heat ; stained for 30 to 35 seconds with 2 drops of solution

A diluted with 1 c.c. distilled water ; washed ; stained for 15 seconds with 3 drops of solution B in 1 c.c. distilled water ; washed and examined.

It is suggested that the methylene blue acts as a dye and mordant and that the trypaflavine-eosin combination acts as a carrier of the eosin.

—U. F. Richardson.

Dold, H. (1933). Ueber das Verhalten der Diphtherie- und Pseudo-diphtheriebakterien gegenüber meiner Differentialfärbung und über neuartige, bisher unbekannte Granula. [**The Behaviour of Diphtheria and Pseudo-Diphtheria Bacteria towards my Differential Staining Method : The Presence of Granules of a New Type**].—*Zlb. Bakt. I.* (*Orig.*). **128.** 265-269. 3 tables.

By using a special staining method described by the author [(1932). *Zlb. Bakt. I.* (*Orig.*). **124.** 220.] for the differentiation of Gram-positive organisms, an irregularity in the staining properties of successive generations of *Corynebact. diphtheria* strains was observed. In subcultures of diphtheroids which gave a negative reaction initially, there appeared certain well-defined centres which could be distinguished from Babes-Ernst granules.—S. J. Edwards.

Birch, T. W., & Dann, W. J. (1933). **Estimation and Distribution of Ascorbic Acid (Vitamin C) and Glutathione in Animal Tissues.**—*Nature.* **131.** 469-470. 1 table.

It has been recognized that the method of estimating reduced glutathione by means of iodine titration gives too high figures owing to the presence of ascorbic acid. It has been assumed however that, except in the suprarenal cortex, ascorbic acid is present only in traces. Using the indophenol titration method of Tillmans for the estimation of ascorbic acid, it was found that up to 40 per cent. of the iodine titre of glutathione could be accounted for by ascorbic acid in tissues other than the suprarenal cortex. There is a close correlation between the quantities of these two substances in the different tissues examined and it is suggested that ascorbic acid and glutathione may be linked factors in an oxidase system. Figures are given of the amounts present in different organs.—Henry Dryerre.

MISCELLANEOUS.

Bierbaum, K. (1933). Die Entwicklung der staatlichen Ueberwachung der Veterinärsera und- impfstoffe in Deutschland. [**The Development of the State Control of Veterinary Medical Sera and Vaccines in Germany**].—*Berl. tierärztl. Wschr.* **49.** 204-207.

This historical survey is an address delivered at the anniversary of the state foundation of the Veterinary High School, Berlin, on January 18th, 1933.

There was no compulsory state control of veterinary sera and vaccines in Germany until 1917, but the producers of swine erysipelas antiserum voluntarily subjected their products to a test by the state. In 1917, however, Prussia introduced the compulsory test of erysipelas antiserum which was extended to apply throughout the country two years later. During the following years the Government enforced the state control of fowl cholera antiserum (1925), of swine fever antiserum (1926), and of tetanus antiserum and of tuberculin (1929). The production and testing of mallein is reserved to the Ministry of Health. Anthrax antiserum, for which a suitable test is not yet developed, is only tested for bacterial contamination. Since 1929 state control has also been extended to all preparations such as ratin, etc.

—R. Wetzel (Hanover).

DART, R. A. (1933). **Studies in Native Animal Husbandry.—8. The Domesticated Animals of Pre-European South Africa.**—*J. S. Afric. Vet. Med. Ass.* **4.** 61-70. [8 refs.]

Very little work has been done to study the domestic animals of the South African native. These animals consisted of dogs, cattle, sheep, goats and barnyard fowls, all of decidedly mongrel types. The source of origin of these animals is a matter of pure speculation. The two basic breeds of cattle, *Bos taurus* and *Bos indicus*, are both clearly represented in the present day native cattle ; both types came to Africa from Asia, but whether in the wild or domesticated state one cannot say. Native sheep and goats appear to have arisen from one common stock having origin in Asia.

Dart gives a most interesting discourse upon the significance of domestic animals and especially cattle in the social and religious phases of a primitive civilization. This is unsuitable for abstraction.—E. J. PULLINGER.

FLEXNER, S. (1933). **Medical Research in the Clinic and Laboratory.**—*Science.* **78.** 1-5. [4 refs.]

An address at the opening of the New York Hospital, briefly reviewing the work of a number of medical pioneers from HARVEY to Claude BERNARD. Flexner claims that " the medical investigator must take all animated nature "—human beings, animals and plants—" as his legitimate field of exploration," and urges that advance in biological knowledge can alone free mankind from the evils of disease.—F. BULLOCK.

TURBET, C. R. (1933). **Plantation Horse Management.**—*Brit. Solomon Islands Protectorate Agric. Gaz.* **1.** 14-16.

An article written for the guidance of plantation managers in island territories in the Pacific. In addition to feeding and the general care of the horse, the prevention and treatment of ailments met with in that area are discussed. These include parasitic infestation, sporotrichosis (causing so-called " Fiji sore " or " swamp cancer ") and wound infections.—C. R. TURBET.

OFFICIAL AND OTHER REPORTS.

NEW ZEALAND. (1933). **Department of Agriculture. Annual Report for 1932-33.** [REAKES, C. J.]. pp. 56. 8 tables. Wellington : G. H. Loney, Govt. Printer. [fcp] [1s. 3d.]

The Director-General [C. J. REAKES] describes the work of the Department for the year in all its phases. The number of dairy cows in milk was 1,889,000 on January 31st, 1933, with an estimated average production of 218 lb. butter fat. Swine fever broke out near Wellington in garbage-fed pigs on 13 farms, but, owing to the activity of veterinary officers, the outbreak was quickly stamped out by slaughter of all pigs and burning of sties. Anthrax occurred on one farm in the far north owing, it was thought, to the use of unsterilized bone manure at least 20 years previously. Mention is also made of the extensive use of limonite in the control of " bush sickness "—an iron deficiency.

The Director of the Livestock Division [J. LYONS] gives a general description of the incidence of the disease throughout the country. Of cattle examined in abattoirs, only 5·1 per cent. were found affected with tuberculosis in any degree. It is disquieting to notice that Johne's disease is on the increase. Blackleg is being efficiently controlled by using the formalinized culture vaccine. In

addition to the diseases of stock, the Livestock Report also deals with slaughter of stock, livestock statistics, dairy inspection, the poultry industry, the wool industry, and such items as rabbit and noxious weeds destruction. There are :— 28,691,788 sheep, 4,072,383 cattle and 513,416 pigs in the Dominion. 5,000 registered dairies are inspected with regard to hygiene and the health of the cows. The poultry industry was responsible for the export of 5,464 cases of eggs. 633,988 bales of wool were produced.

Further reports appear from the Fields Division, Dairy Division, and other divisions of the department. The report of the Wallaceville Veterinary Research Laboratory [C. S. M. Hopkirk,] deals extensively with the results of experimental work on various animal diseases. Particular reference is made to sterility, mastitis, grass tetany of dairy cows, *ante-partum* paralysis, pulpy kidney disease, circling disease and caseous lymphadenitis in sheep.

Sterility work was carried out more particularly on the morphology of the spermatozoa of bulls, while experimental feeding of male rats was also being undertaken. In mastitis, a control scheme, based on leucocyte counts of gravity cream and grouping of cows for milking purposes was discussed. Grass tetany work was based on the raising of blood magnesium by feeding magnesium in various commercial forms to rats, further work being performed on the same lines on sheep and cattle. *Ante-partum* paralysis is stated to be due to ketosis caused usually by fat accumulation in the liver, due to a decrease in the food, leading to deposit of fat in the liver from fat depots. In circling disease of sheep, an organism has been isolated which appears to be specific and is thought to be associated with the entry of larvae of *Oestrus ovis* into the nostrils.

Appended to this report are subsidiary reports by the biochemist and the nutritionist of the veterinary laboratory staff, both valuable contributions.

—C. S. M. Hopkirk.

Tanganyika Territory. (1933). **Annual Report of the Department of Veterinary Science and Animal Husbandry 1932.** [Hornby, H. E.] pp. 95. [Numerous tables and refs.] Dar es Salaam : Govt. Printer. [fcp] [4s.]

This report is submitted under four main headings, viz :—Part I—Staff and General ; Part II—Disease Control ; Part III—Report on the Work of the Veterinary Laboratory, Mpwapwa ; and Part IV—Animal Husbandry and Livestock Trade.

Staff and General.

Mr. H. J. Lowe was acting director for the latter half of the year during the absence, on leave, of Mr. H. E. Hornby. Owing to depressed financial conditions there were further reductions in staff, which included one senior veterinary officer, four stock inspectors and the departmental mechanic.

Disease Control.

Rinderpest.—The control and eradication of rinderpest continued to be a prominent item of departmental activities. Usual drought conditions, intensified by heavy locust infestation, caused serious shortage of grazing in places and rendered effective quarantining of stock a very difficult and sometimes impossible procedure. The policy up to 1931, of quarantine and serum-alone inoculation in dealing with outbreaks, was replaced by one permitting vaccination and double inoculation in addition to quarantine. Double inoculations were only carried out in existing outbreaks, so that no new foci of the disease were created by the change. Vaccination alone was practised mainly amongst trade stock. An important feature of the year's

work was co-operation between the veterinary officers of Kenya and Tanganyika in the inter-colonial boundary zone. At the close of the year 75 per cent. of the cattle of the territory were free from rinderpest or the resulting quarantine restrictions. Complete eradication remains the aim of the department.

Contagious Bovine Pleuro-Pneumonia.—There was a slight extension of this disease to areas contiguous to existing quarantine stations. Shortage of staff prevented the adoption of any organized attempt to deal with the disease by methods other than quarantine, though a limited number of vaccinations were carried out by the veterinary research officer, using Kabete (Kenya) culture-vaccine.

East Coast Fever.—Dipping plus hand dressing remains the only effective method of controlling and eradicating this disease, but the universal application of the method must remain an unapproachable ideal for many years yet. There appear to be seasonal and annual variations in the incidence of the disease, due no doubt in a great measure to the climatic conditions affecting the development and propagation of *Rhipicephalus* ticks. This is only a small portion of a most intricate disease problem, the whole of which urgently requires fuller investigation.

Trypanosomiasis and Tsetse Fly.—Infection of cattle in a varying degree was reported from practically every district in the Territory where livestock exist. Encroachment of tsetse into the already very limited cattle areas is continuing, and presents a most serious and urgent problem which is, however, being tackled by the Tsetse Research Department in close co-operation with the medical and veterinary departments.

Anthrax.—This disease occurs more or less sporadically. A remarkable feature is the fact that natives, in spite of persistent propaganda, continue to eat anthrax carcasses with comparatively rare fatal results.

Blackquarter.—Only in the few outbreaks where mortality was serious were prophylactic inoculations carried out. A Kabete (Kenya) vaccine was used with satisfactory results.

Tuberculosis.—Very occasional cases were found during meat inspection at abattoirs. The apparent rarity of the disease amongst zebu cattle is interesting, particularly so as it is not uncommon amongst human beings. A tuberculin survey will be made as soon as possible.

Foot and Mouth Disease.—Economically this disease is of practically no importance at present. Three outbreaks were reported, all of a mild type without mortality.

Contagious Pleuro-Pneumonia of Goats.—This disease is described as the " most devastating caprine disease in the Territory." In one outbreak practically 100 per cent. mortality was recorded. Quarantine is the only control measure at present in force.

Rabies.—This disease has not yet been diagnosed with certainty in the territory, though several suspected cases have been investigated.

Cysticercus Bovis.—Three per cent. of carcasses examined at various abattoirs were condemned on account of gross infection by this parasite. Gradual education of the native by sustained propaganda in simple sanitation will, it is hoped, bring about improvement. The acting veterinary pathologist reported that he had found well-developed cysts in calves of six weeks to two months old.

Other Diseases.—There are short notes on several other diseases of domestic animals.

Animal Husbandry and Livestock Trade.

As rinderpest becomes controlled, more departmental energy is available for animal husbandry and economics of the livestock industry. It is noted that the

extreme susceptibility to trypanosomiasis of Indian buffaloes renders these animals useless in Tanganyika ; also that attempts to improve local zebu cattle by crossing with imported Indian Krishna Valley bulls ended in failure. Much work was done in fostering an internal livestock trade and in the improvement of hides, skins and ghee.

Finally, there is a detailed account (HORNBY, STAPLES and FRENCH) of the development of an experimental farm in the southern highlands of the Territory. The country is grassland which superficially appears to be eminently suitable for cattle and possibly suitable for sheep. Careful experimental study showed, however, that appearances were deceptive and that many, and possibly insuperable, difficulties would have to be overcome before this grassland could be recommended as sheep country.—S. A. EVANS.

TANGANYIKA TERRITORY. (1933). **Report on the Work of the Veterinary Laboratory, Mpwapwa.** [EVANS, S. A.]—*Ann. Rep. Dept. Vet. Sci. & Anim. Husb. Tanganyika. 1932.* pp. 13-71. Dar es Salaam : Govt. Printer. [fcp] [4s.]

STAFF.—Reduction in the European staff necessitated an increased proportion of routine work being allocated to native assistants, who responded well.

ANTI-RINDERPEST SERUM PRODUCTION.—All field requirements were met with an output of 42,000 doses, each of 40 c.c. As considerable numbers of virus-producers had to be destroyed weekly to furnish spleens for vaccine manufacture, sufficient blood and other antigenic material was available to permit two bleedings instead of five after each hyper-immunization. The intrarumenal method of hyper-immunization has at least the merit of being so exceedingly simple and humane that it hardly inconveniences the animal, and the routine of hyper-immunization, two bleedings followed by a short rest, was no harder on the animals and gave a better serum than the older routine of hyper-immunization and five bleedings followed by a long rest.

ANTI-RINDERPEST VACCINE MANUFACTURE.—61,000 doses, each of 10 c.c., were issued. The usual product was made with formol-glycerine but, if the demand was urgent, the less stable formol-saline product was turned out. Field reports were uniformly good. An important use of the vaccine was for inoculation, followed by ten days quarantine, of trade stock ; the deliberate object being (a) the exacerbation of symptoms of any animal incubating the disease so that these became obvious on inspection and (b) the reduction to a minimum of infectivity of any animal leaving the quarantined area with overlooked disease.

RESEARCH ON RINDERPEST : GOAT-ADAPTED VIRUS.—This was inspired by the recent work of STIRLING in India. It was found, however, that there was no attenuation of virus after 11 consecutive subinoculations through goats.

RESEARCH ON ANAPLASMOSIS.—A practical method of vaccinating European-owned stock was sought. A strain of *Anaplasma centrale* was discovered by a fortunate chance and it was shown that the reaction against this species or variety was mild, but yet protected largely against severe infection by the ubiquitous *A. marginale*. As an alternative, use was made of the so-called " virus of incubation " of *A. marginale* as practised by SERGENT and his collaborators.

It was thought that the, on the whole, satisfactory and mild reactions which follow inoculation with ten-day incubation virus are due to the long incubation period, allowing development of antibodies following a minimal infective dose of fully virulent anaplasms.

Oestrus ovis INFECTION OF SHEEP.—Following a recommendation by STEWART of Australia, a number of heavily infected sheep were treated by driving a stout needle into the frontal sinus and injecting 2 c.c. of a mixture containing equal parts

of carbon disulphide and liquid paraffin. Without exception the animals were much relieved by the treatment, but as local necrosis of varying intensity is inevitable, the treatment cannot be repeated at short intervals.

RESEARCH ON TRYPANOSOMIASIS.—This section has been dealt with separately and appears in this *Bull.* **4**, 223.

RESEARCH ON ANIMAL NUTRITION.—This section has also been dealt with separately and appears in this *Bull.* **4**, 288.—S. A. EVANS.

THE HANNAH DAIRY RESEARCH INSTITUTE [SCOTLAND]. (1933). **Annual Report for the Year ending 31st March, 1933.** [WRIGHT, N. C.] pp. 20. Glasgow : Aird & Coghill, Ltd.

The Hannah Dairy Institute was established with the object of providing a national centre for research in dairying in Scotland. The Council of the Institute, as now constituted, consists of eight members, three representing the West of Scotland Agricultural College, three representing the University of Glasgow, and two nominated by the Secretary of State for Scotland. The Institute is situated at Kirkhill, Ayrshire, the new premises having been occupied in March, 1931.

The first part of the report deals with the constitution and staff of the Institute [Veterinary Pathologist, L. JORDAN,] and reviews the progress made during the past five years. It claims that the work of the Institute in the field of research into animal disease is outstanding. Special attention has been given to the problem of the eradication of bovine tuberculosis. An experiment, having for its object the eradication of this disease from a group of 28 herds, which has been in progress for the past three years, has now been terminated. The method adopted was a modification of Bang's method, the only inducement offered to those participating in the scheme being the provision of free tuberculin-testing and free advice on methods of isolation and on the rearing of tuberculosis-free stock. It is claimed that the final results show that 20 out of 28 herds were clear of tuberculosis after three years while the number of reactors in the remaining eight herds was reduced from an average of 52 per cent. to an average of 24 per cent. It is also claimed that the results of the experiment clearly demonstrate the feasibility of reducing the incidence of tuberculosis among dairy cattle by the provision of relatively small incentives to herd owners.

The report also records research in progress into the nutrition of dairy cattle, the physiology of lactation, the genetics of dairy cattle, crop and stock husbandry, milk fever, the pasteurization of milk, the condensing and drying of milk, factors affecting the solubility of milk powders, and other subjects of importance. It terminates with a list of 40 publications issued.—LL. E. W. BEVAN.

CITY OF LIVERPOOL [ENGLAND]. (1933). **Report of the Chief Veterinary Officer on the Work of his Department for the year 1932.** [PILLERS, A. W. N.] pp. 30. 12 tables. Liverpool : C. Tinling & Co., Ltd. [8vo].

The work of the Veterinary Department [Chief Veterinary Officer and one whole-time veterinary officer] of the City of Liverpool consists chiefly of the management and care of the Health Committee's stud, veterinary attention to horses and livestock of other committees, supervision of cattle and the city's milk supply, and the administration of the Diseases of Animals Acts.

Although the Chief Veterinary Officer has previously emphasized the desirability of regular clinical examination of all milk-producing cows in the city at least quarterly, this was impossible during the year under review owing to the reduction in his staff. Taking the cattle population of the city as 3,750 cows, the figures for the year 1932 indicate that each animal was examined twice. A table

shows that 7,636 veterinary examinations of cows in the city cowsheds were carried out and that 27 (0·35%) of the cows examined were found to be suffering from tuberculosis of the udder, or were giving tuberculous milk. It is interesting to note that all but one of the cases of tuberculous mastitis detected were confirmed by the aid of the microscope.

The opinion is expressed that owners cannot be expected to detect early cases of tuberculosis among their stock, nor, in the absence of regular visits, is it anticipated that they will maintain the present high standard of vigilance reflected in the number of notifications received. Also, while the bulk of milk produced in the city is found to be of Grade A quality, the issue of a licence demands safeguards which have not yet been provided by most producers. It is believed, however, that the interest in the " grading " of milk may increase.

The detection of infected supplies of milk produced outside the city rests with the Medical Officer of Health, who causes samples to be taken from " bulk " milk as it comes into the city. Tuberculous samples are reported to the medical officer of the county of origin. As the result of this system, 28 farms and 1,106 cattle were examined. Contamination arising from tuberculous udders was detected in 23 cases, but in other instances the producers complained that their supplies had been wrongly labelled by contractors. Non-graded milk supplied to hospitals and institutions was found to be tuberculous on 8 occasions, and as a result of examination of the source of supply, 7 tuberculous udders were detected. The corporation's milk supply is estimated at 735,000 gallons a year, involving an expenditure of £50,000. Tenders for this supply were received from 16 firms, and 62 farms and 2,445 cows were examined in this connection. 44 premises were found suitable and 13 unsuitable.

A table shows the number of animals dealt with during 1932 under the Tuberculosis Order of 1925. Briefly, 1,136 animals were examined, 66 were slaughtered (of which 22 were suffering from tuberculosis of the udder), 4 were giving tuberculous milk, 7 were suffering from emaciation, and 33 from chronic cough and definite signs of the disease. Of the 66 slaughtered, 53 were found to be advanced, and 13 not advanced cases of infection. Compensation to the value of £194 was paid to owners.

During the year, 2 cases of anthrax were confirmed, but no cases of glanders, parasitic mange or foot and mouth disease were recorded.—Ll. E. W. Bevan.

City and Royal Burgh of Edinburgh [Scotland]. (1933). **Annual Report of the City and Royal Burgh of Edinburgh Veterinary Department for the year 1932.** [Gofton, A.] pp. 22. 8 tables. Leith: Mackenzie and Storrie, Ltd.

The Chief Veterinary Inspector submits to the Department of Health for Scotland this report of the activities of his Department which consists of one other whole-time veterinary officer and a veterinary pathologist [W. Jowett]. Under the Milk and Dairies (Scotland) Act, 1914, the report deals with the inspection of cows and dairy byres, the health of cows, tuberculosis in cows, cowsheds, tuberculous infection of milk, and the various Milk and Dairies Orders. It refers to the veterinary inspection of meat and other foods, fat-stock markets, abattoirs, wholesale dead meat markets, retail shops, street hawkers, meat storage and port food inspection. A summary shows the manner in which unsound food-stuffs were dealt with. Under the heading " Diseases of Animals Acts," anthrax, foot and mouth disease, parasitic mange of horses, sheep scab, swine fever and bovine tuberculosis are dealt with and the operation of the Movement of Animals (Records) Order, Importation of Animals, Markets, Sales and Lairs Order and other regulations

are discussed. This very comprehensive report must be read to be appreciated.

It may, however, be noted that in accordance with practice, the cattle in all registered dairies in the city were examined at intervals of one month. During the year, 919 such visits were made and 67 visits to non-registered dairies ; and 2,236 cows were examined in the market. On registered dairy premises 21 cows were found to be tuberculous, 8 of which had tuberculous udders. At the abattoirs, of 3,273 cows slaughtered, 1,493 (45·62%) were found to be affected with tuberculosis in some degree. The importance of the economic side of tuberculosis is well illustrated by the figures quoted in relation to meat inspection. These show that this disease is responsible for 83·9% (by weight) of seizures of all classes of beef.

An investigation was undertaken at the instance of the Department of Health to ascertain the extent of tuberculous infection of milk sold to the public in Scotland. The work was carried out jointly by the veterinary department and the bacteriological department of the University. The total number of samples examined was 1,004. Of 320 farm samples of pasteurized milk (holder process), 3 (0·9%) proved infected, and of 22 samples (flash method), 5 (22%) proved positive. Of 318 retailed samples, 48 (15%) gave positive results. 150 samples were examined at the Veterinary Laboratory ; 8 samples of certified and 6 samples of grade A milk fell below the specified standard, and 5 samples of pasteurized milk also failed to conform to the bacterial standard required. Of 108 samples examined for the presence of tubercle bacilli 7 proved positive and 101 negative.

Under the Diseases of Animals Acts, 2 cases of anthrax were detected. Of 40 deaths of bovines investigated, only one was found to be attributable to this disease. The cause of death of 121 cattle, sheep and pigs found dead on arrival of trains and boats or in lairages attached to markets and abattoirs was also investigated. Edinburgh has escaped foot and mouth disease since 1922, and has also a clean record in respect of sheep scab. 12 reports of swine fever were received, the disease being confirmed in 11 cases.—Ll. E. W. Bevan.

—. (1933). Mededeelingen betreffende den Gezondheidsdienst voor Vee in Friesland. Veertiende Jaarverslag 1932-33. [**Communication concerning Health Service for Livestock in Friesland, Holland. 14th Annual Report, 1932-33**]. pp. 42. 1 table. [Publisher not given].

The health service for livestock in Friesland, one of the provinces of Holland, is well organized and has a laboratory where all kinds of investigations can be carried out. Farms and factories are systematically inspected for bovine tuberculosis in order to find and remove infected animals. The intradermal tuberculin test, often followed by the ophthalmic test, is usually employed. Johne's disease is diagnosed by faecal examination or by the intradermal test with avian tuberculin.

The position with regard to contagious abortion, bovine sterility, examination of milk, calf diseases, swine fever, etc. is also described.

—A. Klarenbeek (Utrecht).